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THE FOOD STAMP SCHEME IN SRI LANKA: COSTS, BENEFITS, AND OPTIONS FOR MODIFICATION

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FOREWORD

Many developing countries attempt to assist low-income households to improve their nutritional intake by providing direct or indirect income transfers. The latter are more common and usually take the form of price subsidies on a range of staple foods. Direct transfers, such as issue of food coupons, are not as widely used as price subsidies. In this regard, the case of Sri Lanka is somewhat unusual, for over four decades it followed a policy of subsidizing food prices, and during the late 1970s, this policy was replaced by a direct transfer scheme in the form of a food stamp program.

An analysis of the former food subsidy scheme of Sri Lanka was the subject matter of IFPRI Research Report 13, *The Impact of Public Foodgrain Distribution on Food Consumption and Welfare in Sri Lanka,* by James D. Gavan and Indrani Sri Chandrasekera. This research report by Neville Edirisinghe provides an analysis of the food stamp scheme, which is but one element of a package of policy reforms aimed at greater economic growth undertaken recently in Sri Lanka. Insights from the Sri Lanka case should prove useful in planning income assistance programs to accompany structural changes in economies to bring about greater growth.

This report adds to an array of studies undertaken by IFPRI in the area of food price policies in general and food subsidies in particular. Several such studies have been published, including studies of policies in Brazil, Bangladesh, Kerala State in India, Sri Lanka, and Egypt.

This research was funded by the U.S. Agency for International Development (AID), Bureau for Science and Technology, Office of Nutrition, under the supervision of the Nutrition Economics Group, Office of International Cooperation and Development, of the United States Department of Agriculture (USDA). The assistance of many people at AID and USDA, and particularly that of Dr. Nicolaas Luykx of the Office of Nutrition and Dr. Roberta van Haeften of the Nutrition Economics Group, is acknowledged with thanks. Close collaboration was provided by the Colombo mission of AID. The collaborating agency from the government of Sri Lanka was the Food and Nutrition Policy Planning Division of the Ministry of Plan Implementation. This collaboration and the assistance provided by its head, Dr. Raja Ameresekere, are gratefully acknowledged. The Central Bank of Ceylon is specially thanked for making available data from its surveys, without which a comprehensive analysis may not have been possible.

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This study benefited from the views and comments of many others. Dr. Per Pinstrup-Andersen, Director of the Food Consumption and Nutrition Program of the International Food Policy Research Institute, provided overall guidance and inspiration. My colleagues at IFPRI generously contributed their comments on this and earlier reports of the study. Special mention needs to be made of the three deputy directors of the Food and Nutrition Policy Planning Division who visited IFPRI to take part in the data analysis. Their insights were useful. From the inception of this project, Professor Priyani Soysa of the University of Ceylon provided valuable encouragement and support. Dr. B. V. de Mel of the Medical Research Institute and CARE, Colombo, also gave her fullest cooperation whenever it was required. These two outstanding personalities in the field of child nutrition in Sri Lanka are specially thanked.

I owe a special debt of gratitude to the authorities of the Central Bank of Ceylon for providing the survey data from the Consumer Finance Surveys conducted by the Central Bank during 1978/79 and 1981/82. This study would not have been possible without them.

Finally, I gratefully acknowledge the skillful research assistance provided by Ms. Carol Levin and Mr. Yisehac Yohannes.

1

SUMMARY

In 1979, Sri Lanka replaced a four-decade-old food subsidy scheme characterized by general price subsidies and quantity rationing of rice, the main staple. This study examines the new food stamp scheme, its costs and benefits, and provides some guidelines for modifying the program. The need and potential for modification are discussed within the framework of the economic policy reforms in the late 1970s. These reforms attempted to reduce government intervention in the economy and give the market a larger role in determining prices of outputs and inputs and allocation of resources. The change in the subsidy program was intended to increase domestic savings, while attempting to protect low-income households from the effects of the removal of price subsidies. Only households whose declared incomes were less than a specified level received food stamps, which they could use to buy basic foods made available at authorized shops at nonsubsidized prices. Since its inception, the nominal value of the food stamps has not been changed.

The change to a nonindexed food stamp scheme has reduced the food subsidies' share in total government expenditure to about 3 percent in 1984 compared with around 15 percent during the mid-1970s. Its share of GNP dropped from about 5 percent to 1.3 percent. Whether all the savings have been diverted to investment activity is difficult to ascertain, given the increased subsidies allocated to some other government activities and wage increases to public sector employees to protect them from inflation.

The subsidy scheme replaced by the food stamp scheme gave subsidized rice rations to half the population; price subsidies on other major foods, such as wheat and sugar, were available to all. The highest per capita benefits from the latter subsidy accrued to the high-income households. When the food stamp subsidy began, its benefits constituted only 83 percent of the benefits from the price subsidies. Erosion of the real value of food stamps reduced this to 43 percent by 1981/82. Price subsidies formed nearly 18 percent of the household budget of the average rice ration recipient; the food stamp share was only 9.6 percent. The largest reduction in relative share was seen in the estate sector. This was caused mainly by elimination of the subsidy on wheat, an important staple for estate workers.

The targeting attempts under the curtailed rice ration scheme and the food stamp scheme restricted the transfers to only half of all households, but not all these households were in the lower half of the expenditure range. As a result, the lowest quintile—the quintile that forms the target group according to income criterion for targeting—received only 38 percent of the total food stamp outlay. Households in the lower 40 percent of the expenditure range, which includes most households consuming less than the recommended energy allowance, receive two-thirds of the total food stamp budget. Under the former scheme, this segment received only 50 percent of the total outlays on subsidies.

Between 1978/79, before the policy change, and 1981/82, after it, nearly 75 percent of the households either maintained or increased their per capita calorie consumption. This augurs well for the effect of economic growth on distribution given the drastic changes in the price structure after liberalization of the economy. However, per capita calorie consumption of the bottom 20 percent declined about 8 percent, from an already low 1,490 calories during 1978/79 to 1,368 calories during 1981/82. It appears that these households were not able to take advantage of the new income-earning opportunities created by the economic reforms during this period. It also appears that the food stamp scheme was not effective in helping the most vulnerable households.

A Laspeyres-type price index constructed from survey data under study showed that prices increased 92 percent during this period. The real value of the nonindexed food stamps, thus, was cut in half. The effect of substitutions made following changes in prices and real income was examined by comparing the relative changes between the unit price of calories and the food price index. Substitutions among calorie sources were able to reduce the food expenditures necessary to obtain the same amount of calories by about 7 percent. The incomes of all groups other than the lowest quintile increased enough to reinforce the substitutions and keep consumption from falling.

The effect of food stamps on calorie consumption was estimated on the assumption that households treat food stamps as just another source of income. This assumption was confirmed by a statistical test of the underlying hypothesis. The additional income received through food stamps enabled the lowest quintile to increase calorie consumption 12 percent. The next quintile increased its consumption 6 percent. As expenditures increased, the impact of food stamps on total calories declined significantly because expenditure elasticities were lower and the cost of calories was higher. These relationships and the large share of food stamp outlay "leaked" to upper-income households reduced the cost-effectiveness of the income transfer. Assuming that the primary objective of the food stamp scheme was to improve the nutrition of the households in the lowest quintile, the cost to the Treasury of providing a given amount of calories to these households was 250 percent of the cost incurred by them.

The estimated impact of the food stamps on the nutritional welfare of preschool children revealed that the benefits they receive depend on intrahousehold food allocation practices. A special survey of 480 households showed that food stamp incomes increased the calorie consumption of preschool-aged children in the lowest quintile by 5.4 percent, but they increased the consumption of all other members in the same households nearly 10 percent. However, consumption by children appeared to increase significantly after the more productive members in the household received about 80 percent of the recommended calorie allowance. It appears that income transfers have to be large to ensure an effect on preschool children. The results imply that other child-related intervention programs, including health services and supplementary feeding programs, like the Triposha program, can be an important complement to income transfers.

Evidence makes it clear that a modification of the present food stamp scheme is required if low-income households are to be effectively assisted. The program needs to have a clear objective, such as ensuring a given amount of calorie consumption. To ensure the recommended per capita calorie allowance of 2,200 calories, about a fourfold increase in the subsidy bill would have been necessary during 1981/82. If the given allocation of Rs 1.7 billion was transferred only to households in the bottom quintile, their per capita calorie consumption may have increased to about 1,540 calories—about 70 percent of the recommended allowance. The real problem is to find a proper targeting mechanism. The traditional targeting mechanisms, such as ones based on child malnutrition, regional targeting, or subsidizing "inferior" foods that are self-targeting, have many problems in Sri Lanka. Widespread participation by the people in the democratic process of representative government, a multiparty political system, relatively high literacy rates, and a comprehensive and competent public administrative structure are conducive to devising a targeting scheme in which the administrators and the community together can be effective in screening applications for the income transfer. In a broader perspective, the constraints to effective participation in the present development process by the vulnerable sections must be properly identified and remedial strategies adopted so that the dependence on government transfers for nutritional welfare can be minimized.

2

INTRODUCTION: THE POLICY CHANGE

In 1979, a fundamental change occurred in Sri Lanka's food subsidy program: a long-standing food price subsidy scheme was replaced by a direct income transfer program aimed at a target population. This change was prompted by the need to generate domestic savings to facilitate the overall economic development program launched by the new government, which came into power after a landslide electoral victory in 1977. The new economic reforms were to liberalize the economy from government intervention and give the market a larger role in the determination of the output and input prices and allocation of resources.[1]

The purpose of this study is to examine the costs and benefits of the change in subsidy programs and to examine alternative policies that could increase the effectiveness of the food stamp scheme in protecting the vulnerable groups. For nearly four decades, Sri Lanka had a comprehensive food subsidy scheme. Eligibility was almost universal. Rice, the staple food of the entire population, and other major commodities, including wheat flour, sugar, and powdered milk, were subsidized at some time or another. The amount of the subsidies and the consumer entitlements underwent changes influenced by fiscal and political considerations.

Food subsidies were only a part of the package of welfare policies that has characterized public policy in Sri Lanka. Other elements included free medical and health services, free education from kindergarten through university and provision of highly subsidized public utilities such as public transportation services.[2]

A few salient features in the history of the food subsidy program should be noted.[3] First, notwithstanding some sharp differences in political ideologies, since the country's independence successive national governments continued the food subsidies to attain both political stability and social equity.[4] Second, these subsidies continued, in part, because a remarkably high degree of active political participation by the population, particularly the organized sector of the labor force, provided sufficient pressure to ensure that they did. Third, the success of the subsidy program was linked closely with the country's balance of payments.

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[1] The new government's policies and an agenda of work are given in William Gopallawa, *Statement of Government Policy Made by His Excellency, the President, in the National State Assembly on August 4, 1977* (Colombo: Ministry of Information, 1977). Details of the economic policies and various measures are contained in Ronnie de Mel, *Budget Speech 1978* (Colombo: Ministry of Finance and Planning, 1978). These economic reforms have been described and analyzed by many, including R. Herring, "The Janus-Faced State in a Dependent Society: Sri Lanka's Shifts in Development Strategy," Northwestern University, Evanston, Ill., 1985 (mimeographed); and J. J. Stern, "Liberalization in Sri Lanka: A Preliminary Assessment," Washington, D.C., July 1984 (mimeographed).

[2] Many have pointed to the achievements in the standards of living—life expectancy at 69 years, infant mortality rate at 43 per 1,000, and adult literacy rate at 85 percent—as gains from these public expenditures. See Paul Isenman, "Basic Needs: The Case of Sri Lanka," *World Development* 8 (March 1980): 237-258; and A. K. Sen, "Public Action and Quality of Life in Developing Countries," *Oxford Bulletin of Economics and Statistics* 43 (November 1981): 287-319. Others have argued that the registered gains in living standards are minimal when compared with the living standards that prevailed in Sri Lanka four decades ago. See Surjit Bhalla, "Is Sri Lanka an Exception? A Comparative Study of Living Standards," World Bank, Washington, D.C., July 1984 (mimeographed).

[3] For a discussion of the government role in food production and consumption up to the mid-1970s, see Neville Edirisinghe and Thomas T. Poleman, "Implications of Government Intervention in the Rice Economy of Sri Lanka," International Agriculture Monograph 48, Cornell University, Ithaca, N.Y., January 1976.

[4] Consumption and welfare effects of the ration program are analyzed in James D. Gavan and Indrani Sri Chandrasekera, *The Impact of Public Foodgrain Distribution on Food Consumption and Welfare in Sri Lanka*, Research Report 13 (Washington, D.C.: International Food Policy Research Institute, 1979).

This was because Sri Lanka depended on imports for more than 50 percent of its food supply during most of the period. Lastly, input subsidies to rice farmers and a state-sponsored guaranteed price scheme were intended to minimize the deleterious effects of consumer subsidies on producers.

The food subsidy scheme began as a wartime necessity to ensure that limited supplies were distributed equitably and to protect consumers from postwar inflationary pressures. For more than two decades the program provided a minimum of two pounds of rice per capita per week to the entire population at highly subsidized prices. For a short period in the early 1950s, infants and children received less (see Table 1, which shows all major changes in the rice subsidy scheme between 1948 and 1979). From 1954 to 1966, everyone received four

Table 1—Changes in rice ration allotment and prices of ration and open market rice, 1948-79

Date	Allotment		Ration Price	Open Market Price[a]	
	Paid	Free		Parboiled	Raw
	(pounds/person/week)			(cents/pound)	
1948-July 1952	3.0	0.0	27.0[b]	37.0[b]	37.0[b]
July 1952	2.5	0.0	12.5	44.0	43.0
September 1952	2.0	0.0	12.5	n.a.	n.a.
July 1953	2.5	0.0	35.0	55.5	55.0
October 1953	2.5	0.0	27.5	n.a.	n.a.
November 1954[c]	4.0	0.0	27.5	43.0	43.0
May 1955	4.0	0.0	25.0	39.0	39.0
October 1955	4.0	0.0	12.5	n.a.	n.a.
May 1956	4.0	0.0	20.0	39.0	34.0
June 1958	4.0	0.0	17.5	43.0	40.0
June 1959	4.0	0.0	12.5, 22.5[d]	43.0	41.0
April 1960	4.0	0.0	12.5	42.0	38.5
December 1966	0.0	2.0	0.0	42.5	38.5
September 1970	2.0	2.0	37.5	60.5	59.0
February 1973	2.0	2.0	80.0	135.0	134.0
March 1973	2.0	2.0	70.0	n.a.	n.a.
October 1973[e]	2.0	1.0	100.0	n.a.	n.a.
April 1974	2.0	1.0	115.0	238.0	227.0
August 1974	2.0	1.0	110.0	n.a.	n.a.
November 1975	2.0	1.0	100.0	167.0	163.0
January 1976	1.0[f]	1.0	100.0	153.0	150.0
April 1977	2.0	1.0	100.0	143.0	144.0
May 1977	3.0	1.0	100.0	n.a.	n.a.
February 1978[g]	3.0	1.0	100.0	158.0	160.0
September 1979[h]	...	...	...	...	...

Sources: James D. Gavan and Indrani Sri Chandrasekera, *The Impact of Public Foodgrain Distribution on Food Consumption and Welfare in Sri Lanka,* Research Report 13 (Washington, D.C.: International Food Policy Research Institute, 1979), p. 28; Neville Edirisinghe and Thomas T. Poleman, "Implications of Government Intervention in the Rice Economy of Sri Lanka," International Agriculture Monograph 48, Cornell University, Ithaca, N.Y., January 1976; and Sri Lanka, Ministry of Plan Implementation, Food and Nutrition Policy Planning Division, "Food and Nutrition Statistics," Colombo 1983, Table 2.8.

[a] These are the average prices in Colombo municipality.
[b] This is the average price in 1950.
[c] From 1952 to this period, infants and children received less, and workers more, than the average adult allotment.
[d] The price of the first 2 pounds was 12.5 cents per pound and the next 2 pounds, 2.5 cents per pound.
[e] Income-taxpayers were excluded from the scheme.
[f] In urban areas of rice-deficit districts, an additional pound was issued.
[g] These are rations issued to families with annual incomes less than Rs 3,600.
[h] Rice and some other foods were made available at unsubsidized prices for purchase using food stamps at authorized shops.

pounds of rice per week. During 1966, the quantities issued under ration were halved but the universal subsidy was unchanged.

After the food subsidy scheme had operated for only four years, the postwar inflationary prices of rice created strains that became clearly visible. An attempt to reduce subsidies led to drastic increases in the administered price of rice and other commodities and services. This first attempt to bring administered prices closer to costs was met with widespread protests spearheaded by organized urban labor. These protests in 1953, locally known as the "Harthal," took the form of civil disobedience culminating in riots and damage to life and property. The food riots led to partial abandonment of the subsidy reforms, the resignation of a prime minister and, a short period later, the change of government. The new political regime restored the original benefits. The lower world prices of rice during the second half of the 1950s helped considerably in bringing about these changes. But the political sensitivity of the subsidy program was clear.

During the early 1960s, acute fiscal and balance-of-payments problems led the finance minister to propose that the subsidy be curtailed. This was squelched by the backbenchers; the minister resigned. In the second half of the 1960s, continued balance-of-payments difficulties and a worldwide rice shortage brought a strategic compromise between economic logic and political feasibility: the rice ration was reduced by half but given free of charge. Food subsidies were a key issue in the general election of 1970, however, and political power changed hands. Some increases in the subsidized ration entitlements were made immediately after the elections. These increases were aided by low world prices of rice.

However, the events during 1973/74 clearly showed that the country's food policy depended heavily on international price movements. Worldwide food shortages and the consequent inflationary pressures on the rice and wheat markets were mainly responsible for a series of changes in the ration program, including the halving of the free allotment during 1973 (Table 1). An attempt was also made to reduce the burden of the subsidy by excluding income taxpayers from the free rice entitlement. However, this measure only eliminated about 1 percent of the subsidy.[5] The most fundamental changes in the scheme aimed at reducing the food subsidy burden were carried out by the government elected in 1977.

Other fundamental policy changes included the devaluation of the Sri Lanka rupee by about 46 percent and adoption of a floating exchange rate to provide a more rational basis for international trade; abolition of exchange controls and quantitative restrictions aimed at liberalizing trade (however, a tariff system was introduced to maintain some control); adoption of measures to encourage foreign investments; removal of domestic price controls, except for those on a few "essential" goods; a shift of emphasis in government intervention in the rice market to ensure floor prices, which were substantially increased to provide incentives to producers, and to liberalize trade in input markets to provide a flow of input requirements for agricultural production; changes in domestic interest rates to encourage savings; and the launching of a substantial public investment program dominated by three "lead" projects—the accelerated Mahaweli program, public housing, and urban development program—largely financed by foreign aid.[6]

Two of the main objectives of the new government were to liberalize the trading system, and to raise domestic savings.[7] It should not be surprising that these objectives affected the food subsidy and rationing program directly. Although consumer food subsidies would have significantly raised the quality of life, especially for those at greatest nutritional risk, the costs of providing sub-

[5] Janice Jiggins, "Dismantling Welfarism in Sri Lanka," *ODI Review*, No. 2, 1976, p. 97.

[6] See de Mel, *Budget Speech 1978* and Central Bank of Ceylon, *Review of the Economy 1977* (Colombo: Central Bank of Ceylon, 1978).

[7] de Mel, *Budget Speech 1978*.

sidized food to almost the entire population were high. The net costs of the food subsidies in some years reached 17 percent of the government expenditures and 6 percent of the GNP. By early 1978 the new policies had resulted in a substantial devaluation of the currency, which led to a massive increase in the total food subsidy. The effects of the devaluation may have provided an additional incentive for curtailing the food subsidy.

The reductions in the food subsidy burden were strategically phased to minimize adverse reactions to changes in a program that had existed for over 40 years. They were made in three steps carried out over two years. The first step was a means test conducted in January 1978. It was used to restrict subsidized rice to families whose monthly incomes were less than Rs 300, and resulted in the restriction of rice rations to 7.6 million persons, or nearly 50 percent of the population. There was no change in the quantity of the free ration (one pound of rice per person per week) or in the amount that could be purchased at a subsidized price (three pounds of rice). The procedure of the means test, which was conducted on self-reported incomes of the households, as well as the difficulties in checking on incomes, may have been conducive to underreporting.

The second phase was the change from ration shops to food stamps in September 1979. After much publicity, households were required to apply for food stamps through a declaration of incomes and household composition.[8]

Under the food stamp scheme, households with an income of less than Rs 3,600 per year, with marginal adjustments for larger families, would be issued food stamps (Appendix 1, Table 42). For each child less than 8 years old they would receive stamps worth Rs 25 per month. For each child between 8 and 12, they would receive stamps worth Rs 20 per month. The household would receive stamps worth Rs 15 per month for each member older than 12. The food stamps could be used to purchase a basket of commodities composed of rice, wheat flour, bread, sugar, dried fish, milk, food, and pulses. The prices of these commodities would be specified at unsubsidized levels. Food stamps would be renewed every three months. This would ensure a continuous revision of those eligible. To meet rising fuel costs, kerosene stamps valued at Rs 9.50 per month would be issued to each household eligible for food stamps. These could be used to buy specified food items, but food stamps could not be used to buy kerosene. Households would be attached to cooperative societies or authorized distributors to obtain their food stamp commodities. Unused food stamps could be deposited in the Post Office Savings Bank.

Although large reductions in coverage were expected from the change to food stamps, the number of recipients remained virtually the same as in the curtailed ration scheme. In fact, the number of recipients increased with each issue of stamps (every three months). This led to a freeze on new issues in March 1980. The most striking characteristic of the new food stamp scheme was the allocation of a fixed nominal amount of approximately Rs 1.8 billion in the annual budget for the cost of food and kerosene stamps. In other words, no provision was made to change the value of the food stamps to maintain their real value.

The third phase in the food subsidy reforms was the elimination of subsidies on food prices. Under the rationing scheme, and during the first phase of the new scheme, price subsidies remained on rice, flour, sugar, and infant milk foods. These subsidies amounted to Rs 2,326 million in 1979. Prices of rice, flour, and sugar were raised in 1980 to reflect costs, and the total subsidy was reduced to Rs 305 million. By the end of 1982, these subsidies were almost totally eliminated.

[8] Sri Lanka, Department of the Food Commissioner, "Administration Report of the Food Commissioner, 1979-1981," Colombo, 1983, (mimeographed).

3

PRICE SUBSIDY AND FOOD STAMP BENEFITS

The comparison of the benefits of the two schemes that follows is largely focused on the rice ration recipients and food stamp recipients. Benefits from the price subsidies will be estimated using data from the Consumer Finances and Socioeconomic Survey 1978/79 (CFS 1978/79), conducted by the Central Bank of Ceylon. Benefits from food stamps will be estimated using data from the Consumer Finances and Socioeconomic Survey conducted during 1981/82 (CFS 1981/82) by the same institution (see Appendixes 1 and 2).

Price Subsidy Benefits

The average per capita values of the income transfers received through the price subsidies on rice, wheat flour, bread, and sugar by the households in different expenditure classes are shown in Table 2.[9] The overall per capita value of the price subsidies received during 1978/79 by all households is estimated to be Rs 15.00 per month. The rice subsidy constitutes 51 percent of this mean value. For rice ration recipients, the rice subsidy constitutes 71 percent of the average per capita total subsidy of Rs 21.46. Those not entitled to rice rations received a per capita subsidy of Rs 8.84, the bulk of which came from the wheat and bread price subsidies.

Per capita subsidy receipts by different expenditure classes show that subsidy benefits have increased with expenditures for both categories of households. Those households in the fifth expenditure quintile, the richest, received the highest per capita subsidy benefits overall, with a per capita value of Rs 26.22 received by rice ration recipients. The estimated value for the lowest quintile is Rs 18.92. The subsidies received by the households in upper expenditure classes are larger because they can purchase a larger proportion of the paid ration entitlement, and more wheat and wheat products. (Rice ration recipients were eligible to purchase 1.5 pounds of rice at a subsidized price, over and above the 1 pound of free rice entitlement.) In addition, the upper income households also received higher benefits per capita from the sugar subsidy.

Two important characteristics emerge from this picture of per capita subsidy benefits. First, rice subsidies were expected to be limited to low-income households but instead were received by households throughout the expenditure range. Second, the largest per capita benefits from universal price subsidies on wheat, bread, and sugar were received by the upper income classes.

The sectoral receipts of per capita price subsidies are shown in Table 3. For the recipients of rice rations, the per capita rice subsidy constituted 66 percent in the urban sector, 74 percent in the rural, and 54 percent in the estate.[10] The wheat subsidy is most important in the estate sector, arising out of the high per capita wheat consump-

[9] The expenditure classes employed throughout this study are classified by putting the per capita total household expenditures in an ascending order and then dividing into 5 classes (quintiles) or 10 classes (deciles). The first quintile or decile thus represents the lowest expenditure class.

[10] The urban sector consists of households in the municipal, urban, and town council areas. The estate sector consists of households in tea, rubber, and coconut plantations with 20 or more acres and with 10 or more resident workers. All other households are included in the rural sector. About 72 percent of the total population live in the rural sector, with 20 percent in the urban sector and 8 percent in the estate sector. See Central Bank of Ceylon, *Report on Consumer Finances and Socioeconomic Survey 1978/79* (Colombo: Central Bank of Ceylon, 1980); and Central Bank of Ceylon, *Report on Consumer Finances and Socioeconomic Survey 1981/82* (Colombo: Central Bank of Ceylon, 1984).

Table 2—Food subsidies by commodity group and expenditure quintile, 1978/79

Per Capita Expenditure Quintile	Commodity	Per Capita Value of Subsidy		
		Recipients[a]	Others	All
		(Rs/month)		
1	Rice	13.90	...	11.11
	Wheat and bread	4.21	6.82	4.31
	Sugar	0.81	0.40	0.72
	All	18.92	7.22	16.21
2	Rice	15.46	...	10.00
	Wheat and bread	4.97	7.49	5.57
	Sugar	0.88	0.56	0.76
	All	21.31	8.05	16.33
3	Rice	15.77	...	7.90
	Wheat and bread	5.69	8.30	6.74
	Sugar	0.97	0.66	0.81
	All	22.43	8.96	15.45
4	Rice	16.27	...	6.40
	Wheat and bread	6.11	8.26	7.23
	Sugar	1.02	0.84	0.91
	All	23.40	9.10	14.54
5	Rice	17.91	...	3.35
	Wheat and bread	7.06	8.21	7.83
	Sugar	1.25	1.20	1.21
	All	26.22	9.41	12.39
All	Rice	15.34	...	7.76
	Wheat and bread	5.20	8.00	6.36
	Sugar	0.92	0.84	0.88
	All	21.46	8.84	15.00

Source: Based on Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The 1st quintile had the smallest expenditures; the 5th had the largest.
[a] Rice ration recipients only.

Table 3—Food subsidies by commodity group and sector, 1978/79

Sector	Commodity	Per Capita Value of Subsidy		
		Recipients[a]	Others	All
		(Rs/month)		
Urban	Rice	13.71	...	5.64
	Wheat and bread	6.14	7.75	6.94
	Sugar	0.95	1.04	1.00
	All	20.80	8.79	13.54
Rural	Rice	15.76	...	9.14
	Wheat and bread	4.67	6.16	5.00
	Sugar	0.93	0.85	0.89
	All	21.36	7.01	15.03
Estate	Rice	14.32	...	2.92
	Wheat and bread	11.53	15.44	14.55
	Sugar	0.68	0.47	0.51
	All	26.53	15.91	17.98

Source: Based on Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape).
[a] Rice ration recipients only.

tion in this sector. Data revealed that bread consumption is low in this sector, making up only 10 percent of the total wheat and bread subsidy. The opposite is true in the urban sector: bread makes up 83 percent of the wheat and bread subsidy. In the rural sector, bread and wheat flour subsidies have almost equal shares. For all households in the estate sector, wheat and bread subsidies provide nearly 80 percent of all price subsidies. These two commodities make a 51 percent contribution in the urban sector, and a 33 percent contribution in the rural sector. Food preferences clearly show that a removal of subsidies on wheat would have the largest effect in the estate sector.

Food Stamp Benefits

Food stamp income transfers are not made on a per capita basis. Eligibility is based on household income, household size, and composition. Although food stamps are issued to the individual members of a family, the household probably treats all food stamps and kerosene stamps issued to it as general household income; hence the justification for evaluating food stamps on a per capita basis. Table 4 shows the mean values of food and kerosene stamp benefits received per person as well as by the whole household (see Appendix 3).

The per capita value of food and kerosene stamps is estimated to be approximately Rs 18 per month for stamp recipients. The mean value of stamps per receiving household is about Rs 95 per month. The poorest 40 percent of the households receive higher values of food stamps, with the highest value per household, Rs 115, received by the bottom 20 percent. Yet, the highest per capita values are not received by this quintile. This discrepancy may have been brought about by the eligibility criteria that discriminate against large households (discussed later in this chapter).

The nominal value of the food stamps allocated to different recipient categories has not changed since the food stamp program was introduced, although in 1984 the value of the kerosene stamps issued to a household increased from Rs 11.50 to Rs 22.00. Thus the purchasing power of the food stamp income has declined with each increment in the prices of goods and services that the recipient households used to purchase in 1978/79. The values of the food stamps received in 1981/82 in terms of the 1978/79 price structure are shown in Table 4. In general, the real value of food stamps had been almost halved by 1981/82. However, a loss of real value relative to a bundle of goods and prices of a base year does not necessarily mean that welfare has eroded to an equal extent. Increases in over-

Table 4—Food stamp receipts by expenditure quintile, 1981/82

Per Capita Expenditure Quintile	Food Stamps Per Capita	Household Size	Food Stamps Per Household	Real Value of Stamps[a]	
				Per Capita	Household
	(Rs/month)		(Rs/month)	(1978/79 Rs/month)	
1	18.43	6.24	115	9.00	56.10
2	18.89	5.39	101	9.35	50.00
3	16.99	4.89	82	8.41	40.60
4	17.00	4.24	72	8.50	36.00
5	17.25	3.67	63	9.32	34.05
All	17.98	5.28	94.93	9.36	49.44

Source: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

Notes: Food stamps include kerosene stamps. The 1st quintile had the smallest expenditures; the 5th had the largest.

[a] The deflators are discussed in Chapter 7.

all household incomes and substitutions among goods and services are countervailing forces that may help maintain welfare.

Table 5 relates the value of the food stamps to the total price subsidies and rice ration subsidies received during 1978/79. It appears that even at the beginning of the food stamp program, the overall income transfer was about 17 percent less than the transfers given through price subsidies. By 1981/82, the real value of the transfer had fallen to only 43 percent of the total subsidy transfer given to ration recipients.

Subsidies Relative to Household Expenditures

The contribution of the food subsidies to household total expenditures during 1978/79 and 1981/82 is shown by sector and expenditure class in Table 6. Compared with food stamp recipients during 1981/82, rice ration recipients during 1978/79 were clearly better off, having received about 18 percent of their average household budget from price subsidies on rice and other foods. The contribution of the subsidy to the average household expenditures of food stamp recipients was almost halved after the changeover to food stamps. Even the households not eligible to receive rice rations in 1978/79 received nearly 5 percent of their average consumption expenditures through the generalized food price subsidies. When looked at by sector, the reductions in the contribution of food subsidies to household expenditures generally follow the pattern for the whole economy, with the worst negative effects seen in the estate sector. The smaller proportion of food stamp recipients in this sector and the removal of price subsidies on other foods, particularly on wheat flour, drastically reduced the importance of government assistance in the total consumption by these households.

Households in the bottom quintile have been the highest beneficiaries under both programs. They had the smallest reduction in the contribution of the subsidies to total expenditures after the program change, a reduction of 38 percent—from 24.5 percent of total expenditures to 15 percent—whereas households in the second quintile and others suffered reductions of more than 50 percent.

Finally, the importance of the price subsidies under these two programs in the expenditures of households grouped by

Table 5—Value of food stamps as a share of the general food subsidy and of the rice ration subsidy received during 1978/79, by expenditure quintile

Per Capita Expenditure Quintile	Food Stamps as a Share of the General Food Subsidy[a]		Food Stamps as a Share of the Rice Ration Subsidy	
	At Inception[b]	During 1981/82	At Inception[b]	During 1981/82
	(percent)			
1	0.97	0.47	1.32	0.65
2	0.88	0.43	1.22	0.60
3	0.75	0.37	1.07	0.53
4	0.72	0.36	1.04	0.52
5	0.65	0.35	0.96	0.52
All	0.83	0.43	1.17	0.61

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

[a] The general food subsidy includes the value of rice ration subsidy and the food price subsidies received by rice ration recipients.

[b] The food stamp scheme was introduced in September 1979.

Table 6—Subsidies as a share of total expenditures by sector and expenditure quintile, 1978/79 and 1981/82

Sector/Group	Year	Per Capita Expenditure Quintile					
		1	2	3	4	5	All
Urban							
Rice ration recipients	1978/79	26.18	17.74	14.14	11.07	7.73	17.76
Rice ration nonrecipients	1978/79	7.92	5.82	4.78	4.17	2.38	3.82
Food stamp recipients	1981/82	13.27	8.80	6.17	5.00	3.03	8.21
Rural							
Rice ration recipients	1978/79	24.18	18.57	14.97	11.61	8.92	17.99
Rice ration nonrecipients	1978/79	6.27	4.79	4.07	3.23	2.02	3.54
Food stamp recipients	1981/82	15.41	9.67	6.66	4.96	3.34	9.92
Estate							
Rice ration recipients	1978/79	25.92	20.50	18.68	16.71	9.20	19.22
Rice ration nonrecipients	1978/79	11.15	10.25	9.99	8.88	6.57	9.12
Food stamp recipients	1981/82	10.17	7.86	4.82	4.53	2.67	7.14
All							
Rice ration recipients	1978/79	24.58	18.53	14.98	11.80	8.67	17.99
Rice ration nonrecipients	1978/79	7.17	6.20	5.55	4.36	2.61	4.50
Food stamp recipients	1981/82	15.09	9.55	6.56	4.96	3.27	9.66

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The 1st quintile had the smallest expenditures; the 5th had the largest.

occupation is indicated in Table 7. The contribution of the subsidies, received through price subsidies as well as food stamps, was most important for labor groups, who make up most of the low-income households. The real income losses after the changeover to the food stamp scheme may have been largest among these households. Whether these losses have been offset by increased household incomes will be examined below.

Table 7—Share of subsidy in the total household budget, by occupational group and expenditure quintile, 1978/79 and 1981/82[a]

Occupational Group	Quintile 1		Quintile 2		Quintile 3		Quintile 4		Quintile 5	
	1978/79	1981/82	1978/79	1981/82	1978/79	1981/82	1978/79	1981/82	1978/79	1981/82
Professional	18.7	16.7	16.5	8.4	11.4	5.4	10.0	4.6	9.5	2.6
Clerical	23.0	7.5	14.7	7.8	11.3	4.6	9.1	3.3	6.6	2.5
Sales	25.2	13.1	17.6	8.6	15.4	6.6	11.3	5.1	7.6	3.2
Service	25.0	15.3	17.3	9.6	14.0	6.8	11.8	5.0	9.4	3.5
General farmers	22.8	14.4	17.8	9.9	15.0	6.9	10.9	4.9	8.6	3.4
Estate labor	25.2	14.5	19.8	9.3	16.7	5.9	15.3	5.2	8.9	3.3
Agricultural labor	24.2	16.1	19.7	10.0	16.3	6.7	12.1	4.9	10.3	3.6
Miscellaneous agricultural labor	23.2	16.5	18.6	9.1	15.2	6.7	12.2	5.1	9.3	3.6
Production	25.4	13.9	18.7	9.2	14.7	6.3	11.6	4.9	8.4	3.0
Miscellaneous labor	24.6	14.5	19.7	9.1	14.6	6.7	13.2	4.9	8.5	3.2
Miscellaneous	25.7	19.7	18.5	14.4	15.3	7.2	11.9	5.5	8.8	3.7

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

Notes: The quintiles are all households grouped by their per capita expenditures. The 1st quintile had the smallest; the 5th had the largest.

[a] Data related to 1978/79 are for rice ration recipients only.

4

THE BENEFICIARIES

To what degree were the intentions to limit the benefits to "weaker sections" achieved? Identification of "leakages" to unintended beneficiaries can help determine the cost-effectiveness of the transfer program. It can also help show how the program can be modified.

Frequency of Recipients in Different Strata

Table 8 shows the percentage of households receiving food stamps in 1981/82 and the percentage receiving price subsidy benefits during 1978/79 by expenditure quintile. The change from the general food subsidy to the food stamp scheme reduced the number of households receiving food-related government transfers by about half. Although rice rations were limited to half the population in 1978, price subsidies on a few other major food items allowed almost all households to receive some elements of the overall food subsidy. It was only when these price subsidies were eliminated (by mid-1980) that only half of all households became "targeted." But comparison of the incidence of food stamps recipients with that of the targeted rice ration recipients shows virtually no difference between the two programs.

Administratively, eligibility for food stamps has been based on household income rather than expenditures. If households are classified by income, the estimates are completely consistent with estimates using a classification of households by expenditures (Table 9). The picture remains the same even when the households are classified by their total income (Table 10).

Table 11 shows the proportion of households receiving food stamps and rice ration recipients in the urban, rural, and estate sectors and in the five geographical zones defined by the Central Bank.[11] It appears that the revalidation of food stamps shifted the proportions within sectors and geographical zones. Rural households also appear to be affected least by the shift from the rice rationing scheme to the food stamp scheme. The percentages in the urban and estate sectors decreased from 41 and 21 percent under the rationing scheme to 32 and 13 percent under the food stamp scheme. Although the absolute decline is about 8 percentage points in both sectors, the relative decline in the estate sector is twice that of the urban sector. Estate sector income is concentrated among the organized labor working in the tea, rubber, and coconut plantations. Their wage payments are highly identifiable and are usually received by more than one member of a household.[12]

The rural sector had the highest proportion of households receiving stamps or rations—58 percent in both periods. This may be attributed to the difficulty of assessing rural incomes, which are mostly agriculture-related and seasonal, in monetary terms. The incidence may also have been high because average incomes in the rural sector were lower than in the urban sector and the average number of income earners per household was lower than in either the urban or the estate sector. Average urban

[11] The administrative districts falling under each zone are as follows: In Zone 1, Colombo (except Municipality Area), Gampaha, Kalutara, Galle, and Matara. In Zone 2, Hambantota, Monaragala, Ampara, Polonnaruwa, Anuradhapura, and Puttalam. In Zone 3, Jaffna, Mannar, Vavuniya, Trincomalee, and Batticaloa. In Zone 4, Kandy, Matale, Nuware-Eliya, Badulla, Ratnapura, Kegalle, and Kurunegala. And in Zone 5, Colombo municipality.

[12] The average number of income earners in a household in the urban, rural, and estate sectors during 1981/82 was 1.64, 1.45, and 2.46, respectively (Central Bank of Ceylon, *Report on Consumer Finances and Socioeconomic Survey 1981/82*).

Table 8—Percent of households receiving food stamps, 1981/82, and general food subsidy and rice ration subsidy, 1978/79, by expenditure quintile

Per Capita Expenditure Quintile	1981/82	1978/79	
	Households Receiving Food Stamps	Households Receiving General Food Subsidy	Households Receiving Rice Ration Subsidy
		(percent)	
1	79.6	100	80.8
2	65.8	100	65.3
3	50.7	100	50.3
4	36.7	100	39.6
5	15.0	100	18.5
All	49.6	100	50.9

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The 1st quintile had the smallest expenditures; the 5th had the largest.

incomes are higher, more regular, and easier to assess than rural.[13]

The rural bias of the food stamp scheme can also be seen in the distribution of the incidence of government transfer by zone (Table 11). The administrative districts grouped together in the zones are more or less economically homogeneous.[14] The highest proportion of households receiving food stamps and the largest increase over the proportion of those receiving rationed rice are seen in zones 2 and 3. These two zones contain administrative districts where farming related to domestic agriculture is predominant. In other zones, the revalidation process appears to have reduced the proportion of households receiving government transfers. Zone 4, in which most of the estate sector is located, has fewer food stamp recipients than it had rice ration recipients. A larger decrease is seen in zone 1, which contains more commercialized districts from the western and southern coastal line. Zone 5 contains the Colombo municipality, the most urbanized area in the country. The decline in the incidence of government transfers in this zone is in line with the decline in the urban sector as a whole.

These patterns of food subsidy distribution also hold for an ethnic classification of the households. According to CFS 1981/82, the Sinhalese, Sri Lankan Tamils, Indian Tamils, and all other minority groups constitute 74.6, 11.4, 6.9, and 6.9 percent of the total number of households surveyed. According to Table 12, the proportion of households receiving food subsidies is virtually the same among all communities and income classes, except for the Indian Tamils, who make up most of the estate sector households.

The distribution pattern of transfers among expenditure quintiles for the whole country changes little when the quintiles are broken down by sector and zone. The incidence is consistently higher in the rural sector across the entire expenditure range. Zones 2 and 3 have both the highest number of households receiving transfers across dif-

[13] Ibid., p. 192. The median income in the urban sector was Rs 977 in 1978/79 compared with Rs 781 in the rural sector and Rs 376 in the estate sector.
[14] Central Bank of Ceylon, *Report on Consumer Finances and Socioeconomic Survey 1981/82.*

Table 9—Share of households receiving food stamps and the value of food stamps received, by per capita income quintile, 1981/82

Per Capita Income Quintile	Per Capita Income		Share of Households Receiving Food Stamps	Value of Food Stamps Per Capita[a]	Number of Recipients in Household	Total Value of Food Stamps[a]
	All	Recipient Households				
	(Rs/month)		(percent)	(Rs/month)		(Rs/month)
1	113	112	75.60	18.59	6.11	113.58
2	174	173	63.53	18.13	5.40	97.90
3	233	232	56.78	17.67	5.00	88.35
4	328	322	37.46	17.26	4.37	75.42
5	802	598	14.53	17.14	3.87	66.33
All	330	216	49.58	17.97	5.28	94.88

Source: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The 1st quintile had the smallest income; the 5th had the largest.
[a] This is calculated for those receiving food stamps alone.

ferent expenditure quintiles and the highest proportion of the poorest households receiving transfers.

It is also instructive to examine the transfer recipients by occupational group. The occupational categories in Table 13 are based on the main occupation declared by the head of household. Since there may be other income earners, the total income earned by a household may not reflect the earnings of its head. The 11 groups shown in Table 13 are comparable between the two data sets.

Agricultural labor households and miscellaneous labor households have the highest proportion receiving food stamps, about 80 percent. Their participation in the food stamp program was larger than in the rice ration program. These households make up about 14 percent of all households and about 26 percent of the households in the lowest expenditure quintile. The next highest participation rate is for households in the miscellaneous labor category, which contains about 5 percent of all households. The participation rates of these labor categories show that the food stamp scheme has been quite effective in covering some of the most vulnerable households. A high proportion (56 percent) of paddy cultivators

Table 10—Share of households receiving food stamps and the value of food stamps received, by total household income quintile, 1981/82

Total Household Income Quintile	Total Income		Share of Households Receiving Food Stamps	Total Value of Food Stamps	Number of Recipients in Household
	All	Recipient Households			
	(Rs/month)		(percent)	(Rs/month)	
1	501	494	72.98	73.17	3.84
2	827	825	61.95	91.72	5.08
3	1,130	1,121	55.05	102.22	5.87
4	1,624	1,600	42.09	107.68	6.47
5	4,160	3,059	15.81	107.02	7.54
All	1,648	1,067	49.58	94.90	5.28

Source: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The 1st quintile had the smallest expenditures; the 5th had the largest.

Table 11—Share of households receiving food stamps, 1981/82, and rice rations, 1978/79, by sector, zone, and expenditure quintile

Sector or Zone Stamps or Rations	Per Capita Expenditure Quintile					
	1	2	3	4	5	All
	(percent)					
Urban						
Stamps	69.2	54.9	43.6	30.1	8.1	32.5
Rations	77.6	60.7	45.5	36.8	11.9	41.0
Rural						
Stamps	82.5	72.5	57.7	42.2	19.4	57.2
Rations	83.3	72.0	58.2	44.1	24.1	58.6
Estate						
Stamps	43.6	15.2	8.9	8.0	6.8	13.2
Rations	44.6	28.6	14.9	19.1	10.5	21.0
Zone 1						
Stamps	76.1	63.0	53.4	33.7	12.1	43.6
Rations	84.4	67.2	53.0	42.8	17.3	52.0
Zone 2						
Stamps	85.7	71.1	62.5	48.9	19.1	60.5
Rations	72.9	63.1	42.3	37.4	18.6	48.2
Zone 3						
Stamps	84.5	77.8	61.1	46.9	24.7	58.0
Rations	77.9	66.2	60.5	44.9	27.2	52.3
Zone 4						
Stamps	78.5	63.5	41.8	31.4	14.7	49.2
Rations	81.9	65.6	47.8	36.9	19.4	52.6
Zone 5						
Stamps	58.8	33.3	29.7	24.4	8.9	24.6
Rations	59.0	46.7	48.8	25.6	8.9	29.7

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

Note: The zones are economically homogeneous groupings of administrative districts. Zone 1 is made up of more commercialized districts on the western and southern coasts. Zones 2 and 3 contain districts dominated by agriculture. Most of the estate sector is in Zone 4. The most urbanized part of the country, Colombo municipality, is Zone 5. The 1st quintile had the smallest expenditure; the 5th had the largest.

and other farmers, including livestock farmers, fishermen, and hunters, also receive the government income transfers.

Forty-one percent of the estate labor households in tea, rubber, and coconut plantations receive food stamps. The participation rate for estate labor households in the lowest expenditure quintile is 74 percent. These rates were almost the same under the rice rationing scheme. Next to professionals, the lowest incidence is seen among the clerical workers, most of whom are employed in the public sector. Their incomes can be determined readily.

Professionals, clerical workers, sales workers, farmers, and production workers each account for more than 10 percent of the households in the highest expenditure quintile. The participation rates of these households in the food stamp scheme range from 5 percent for professionals to 20 percent for general farmers.

Shares of Total Outlay

The shares of total government outlays on food and kerosene stamps received by the households in different expenditure classes and sectors during 1981/82 are presented in Table 14. The two lowest expenditure quintiles received about two-thirds

Table 12—Share of households receiving food stamps, 1981/82, and rice rations, 1978/79, by ethnic group and expenditure quintile

Per Capita Expenditure Quintile	Sinhalese		Sri Lankan Tamils		Indian Tamils		All Other	
	Stamps	Rations	Stamps	Rations	Stamps	Rations	Stamps	Rations
	(percent)							
1	82.0	84.4	79.0	77.0	55.3	44.4	77.6	68.4
2	69.4	69.2	71.5	72.8	28.2	34.0	63.0	59.3
3	54.5	54.4	58.0	62.8	12.1	17.4	52.4	48.8
4	38.3	42.5	46.3	46.7	9.5	18.2	35.1	30.4
5	15.1	18.1	19.9	22.3	7.8	14.1	9.1	20.1
All	52.1	54.2	52.3	52.2	20.0	23.1	46.6	46.9

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The 1st quintile had the smallest expenditures; the 5th had the largest.

of the total outlay, with the lowest quintile receiving 38 percent. If the intended target group was the bottom 20 percent of the population, these figures indicate that over 60 percent of the food stamp budget is being received by "unintended" beneficiaries. Even if the target range is broadened to include the households in the lower 40 percent of the expenditure range, this indicates a leakage of a third of the total outlay.

As shown in Table 15, under general price subsidies and rice rationing, the poorest 40 percent received only 50 percent of the total food subsidies made on rice, sugar, and wheat flour. The lowest quintile received only 25 percent. Because of leakages in the rice rationing scheme and the universal price subsidies on other basic food commodities, households in the highest three quintiles enjoyed nearly half of the food subsidy. With the elimination of general price subsidies and introduction of the food stamp scheme, the leakage was reduced from one-half to one-third but still appears to be substantial.

The shifts in the shares of the total subsidy allocations harmed the estate sector the most (Tables 14 and 15). The decline in the subsidy share from 10.1 percent of the total food subsidy in 1978/79 to 1.1 percent during 1981/82 resulted from the combined effect of elimination of price subsidies, particularly those on wheat, and the removal of a large number of estate sector households from the food stamp scheme. Better scrutiny of applications for food stamps in the urban areas and the removal of general price subsidies are reasons why the urban sector share also declined from 20.8 percent to 11.8 percent during the two periods. However, this is only a 43 percent reduction compared with the reduction of almost 90 percent experienced by the estate sector. The reduced shares of these two sectors raised the share of subsidies going to the rural sector substantially.

Who are the Intended Beneficiaries?

The intended beneficiaries, according to the regulations governing the food stamp scheme, were households with monthly total incomes of Rs 300 or less in 1979, based on a five-member family. The income cut-off point in the targeted rice rationing scheme was the same. The basis for this income cut-off level is not given explicitly. However, considering that the average cost of 100 calories in 1969/70 was about 4 cents, and the cost of living (food) index increased about 80 percent between 1969 and 1978, it may have been perceived that

Table 13—Share of occupational groups and expenditure quintiles receiving food stamps, 1981/82, and rice subsidies, 1978/79

Occupation	1981/82 Food Stamps						1978/79 Rice Subsidy
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	All	
				(percent)			
Professional							
Share receiving	56	40	22	17	5	15	13.0
Share in quintile	1.5	3.0	5.5	9.1	20.3	7.9	6.7
Clerical							
Share receiving	44	29	20	16	6	14	14.4
Share in quintile	1.0	2.4	5.1	7.4	11.8	5.5	4.4
Sales							
Share receiving	71	65	52	35	13	42	50.4
Share in quintile	6.2	7.4	9.2	10.2	13.1	9.2	10.0
Service							
Share receiving	63	48	35	29	22	38	45.3
Share in quintile	4.0	4.8	5.1	5.5	6.1	5.1	5.0
General farmers							
Share receiving	79	73	64	44	20	56	56.7
Share in quintile	15.1	18.7	17.8	19.1	15.3	17.2	19.2
Estate labor							
Share receiving	74	45	28	24	13	41	41.4
Share in quintile	12.7	14.0	13.7	10.4	4.5	11.1	12.8
Agricultural labor							
Share receiving	92	86	76	67	18	82	74.5
Share in quintile	8.2	6.2	3.8	2.7	0.7	4.3	6.7
Miscellaneous agricultural labor							
Share receiving	88	81	74	66	54	79	73.5
Share in quintile	17.6	10.5	9.3	6.6	2.8	9.4	3.3
Production							
Share receiving	81	70	55	39	17	55	59.7
Share in quintile	20.8	23.4	21.2	19.3	15.5	20.1	19.8
Miscellaneous labor							
Share receiving	76	68	50	40	33	61	63.8
Share in quintile	8.4	5.4	4.1	3.3	1.5	4.5	5.0
Miscellaneous							
Share receiving	83	64	60	44	21	49	49.8
Share in quintile	4.4	4.2	5.2	6.4	8.4	5.7	7.1
All							
Share receiving	79.6	65.8	50.7	36.7	15.0	49.6	50.9
Share in quintile	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The 1st quintile had the smallest expenditures; the 5th had the largest.

an average family of five required Rs 300 per month to meet the per capita calorie allowance of 2,200 calories per day.[15] The additional income transfers may have been intended to ensure such amounts of food expenditures.

Table 16 makes it clear that the intended beneficiaries, according to the income criteria adopted, cannot be in any quintile of the household income distribution but the lowest.[16] The average per household monthly income of the lowest

[15] From Gavan and Chandrasekera, *The Impact of Public Foodgrain Distribution*, Table 18; and Central Bank of Ceylon, *Annual Report 1982* (Colombo: Central Bank of Ceylon, 1983).
[16] This assumes that at least 25 percent of the households in the second quintile may have household incomes less than Rs 300.

Table 14—Distribution of food stamp payments by expenditure quintile and sector, 1981/82

Per Capita Expenditure Quintiles	Urban Sector	Rural Sector	Estate Sector	All
		(percent)		
1	3.8	34.2	0.47	38.4
2	2.8	25.4	0.28	28.4
3	2.3	15.3	0.20	17.8
4	2.0	8.9	0.16	11.1
5	0.9	3.2	0.03	4.1
Total	11.8	87.1	1.14	100.0

Source: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The 1st quintile had the smallest expenditures; the 5th had the largest.

Table 15—Distribution of the total subsidy, by expenditure quintile and sector, 1978/79

Per Capita Expenditure Quintiles	Urban Sector	Rural Sector	Estate Sector	All
		(percent)		
1	5.2	19.7	0.8	25.7
2	3.9	17.7	2.3	23.9
3	3.3	14.0	2.9	20.2
4	3.7	10.9	2.6	17.2
5	4.7	6.8	1.5	13.0
Total	20.8	69.1	10.1	100.0

Source: Based on Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The 1st quintile had the smallest expenditures; the 5th had the largest.

quintile during 1978/79 was Rs 303. On the other hand, it is not until household income entered the third quintile that the expected per capita average calorie consumption of 2,200 calories was achieved by the households (see Chapter 6). Interestingly, even during 1969/70, the per capita calorie consumption of nearly 36 percent of the population was less than 2,200 calories.[17] Under these circumstances, one may assume, the target group would be the households in the lowest quintile, based on the stipulated household income criterion. The calorie consumption criterion would allow the bottom 40 percent of the households to be included in the target group.

Data presented in Tables 8 through 13 clearly show that the attempts to limit government transfers to the most needy have been only partially successful. Although about half the households were recipients of government transfers, given either in the form of rice rations or food stamps, this half is by no means the same as the poorer half of the population. In fact, about 30 percent of the households in the poorer half of the population appear not to have received as much of the transfer benefits as a similar percentage in the upper half of the population appears to have enjoyed. However, the largest percentage of recipients is in the lowest quintile, indicating that a substantial

Table 16—Mean household income by household income quintile, 1978/79

Household Income Quintiles	Average Per Household Income
	(Rs/month)
1	303
2	507
3	696
4	970
5	2,192

Source: Based on Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The 1st quintile had the smallest expenditures; the 5th had the largest.

[17] See Gavan and Chandrasekera, *The Impact of Public Foodgrain Distribution*, p. 20.

proportion of the intended beneficiaries received transfers.

There could be many reasons for the failure to get food stamps to some of the poorest segments of the population. The eligibility criteria of the scheme may have eliminated households with incomes just over the income cut-off point but with five or fewer members. For example, a household with an income of Rs 301 and five members would not be eligible for food stamps, whereas a household with an income of Rs 300 and five members would receive stamps (Appendix 1, Table 42). An earlier survey of the food stamp scheme pointed out that in the process of screening, oversights or misunderstandings of income declarations may have caused benefits to be denied to qualified segments of the population.[18] The food stamp scheme has apparently lacked systematic procedures for considering appeals for redress. The same survey also found that a lack of information was not a significant reason for the failure of some apparently eligible households to get food stamps.[19]

[18] Sri Lanka, Ministry of Plan Implementation, "Survey Report of the Food Stamp Scheme," Colombo, 1981 (mimeographed).
[19] Ibid.

5

THE EFFECT ON FISCAL COSTS AND INCOME DISTRIBUTION

Fiscal Costs

A major objective of the economic reforms of the post-1977 period has been to increase domestic savings. The change from general food price subsidies and quantity rationing to income transfers through food stamps has been successful in reducing the fiscal burden of the food-related welfare policies. This is clearly shown in some of the government accounts shown in Table 17. Broadly, the proportion allocated to food subsidies in total government expenditures was reduced by more than half after the program change. Removal of general price subsidies, targeting, and the allocation of a constant nominal amount for food stamps are major factors in this change.

In earlier years, some foods imported by the government were sold at a profit, which helped reduce the net food subsidy. The negative values for different commodities in Table 17 indicate these profits. This practice is particularly evident in the profits from the sale of sugar, which substantially reduced the net food subsidy during the 1960s. The reduction or absence of these profits in later years, increased costs of imports, and the growth in the size of the population receiving subsidy benefits made food subsidies account for a large share of the government budget. In the mid-1970s, these subsidies accounted for approximately 15 percent of government expenditures and about 5 percent of the gross national product. By 1982, total food subsidies, 95 percent of which were for food and kerosene stamps, had fallen to 5 percent of the total government expenditures and 2 percent of GNP. Changes in the size of the government budget itself also affected these changes in the relative share of the subsidy. Between 1969/70 and 1977, for example, the rate of growth in the size of the nominal government budget was about 13 percent. Between 1977 and 1982, this rate of growth increased to nearly 30 percent.

How big would the fiscal costs have been if the subsidy programs had not changed? The fiscal costs of the food subsidy were simulated under two assumptions for 1979 to 1984; the results are presented in Table 18. The first assumption is that food stamps are not introduced but targeted rice rations and general food price subsidies continue. Under the second assumption, targeted food stamps continue but are linked to an index of rice prices.

Under the first assumption, the total subsidy in 1979 would have been Rs 3,101 million. Assuming that the total subsidy increases, as it has in the past, about 20 percent annually, which is slightly less than the rate of growth of the subsidy between 1966/67 and 1977, the total food subsidy in 1984 would have been Rs 7,714 million. In such circumstances the food subsidy would have amounted to 13-15 percent of total government expenditures, and 5-6 percent of the GNP (Table 18).[20]

Under the second assumption, which is perhaps the more relevant one, the food stamp budget increases annually by 20 percent to reflect changes in rice prices. Be-

[20] The large size of the subsidy in 1978 and 1979, notwithstanding the effect of eliminating nearly 50 percent of the population from the receipt of food rations, is almost wholly due to the increased cost of food imports. This reflects the effects of devaluation on the rupee costs of food imports. The rupee was devalued by 46 percent against the U.S. dollar in late 1977. The effects of increased import prices on the food import and distribution bill is discussed in the annual reports of the Central Bank pertaining to these years. The assumed 20 percent annual increase in the subsidy is expected to include price and population changes.

Table 17—Fiscal costs of food subsidy programs, 1966/67-1984

Year	Rice	Flour	Sugar	Others	Net Subsidies	Food Stamps	Kerosene Stamps	Value of Total Subsidies and Stamps		Total as a Share of Government Expenditures[a]	Total as a Share of GNP
								Nominal	Real[a]		
	(Rs million)							(1952 Rs million)		(percent)	
1966/67	445.3	−22.1	−224.8	3.6	202.0	...	...	202.0	175.9	8	2
1967/68	548.9	−24.0	−239.5	10.9	296.3	...	...	296.3	243.8	10	3
1968/69	582.0	−11	−254.6	12.6	328.8	...	...	328.8	251.9	10	3
1969/70	532.4	3.6	−221.1	12.5	327.4	...	...	327.4	236.9	9	3
1970/71[b]	586.2	10.4	−64.0	1.9	534.5	...	...	534.5	376.6	14	5
1971/72	526.5	22.6	−47.1	33.2	525.2	...	...	525.2	384.2	10	4
1972/73	564.0	111.0	−21.8	24.0	677.2	...	...	677.2	409.6	13	4
1974	745.1	148.1	26.5	30.8	950.5	...	...	950.5	511.5	16	5
1975	785.5	218.0	215.0	11.9	1,230.4	...	...	1,230.4	620.5	17	6
1976	679.3	52.0	165.1	41.2	937.6	...	...	937.6	467.2	11	4
1977	943.0	363.6	70.0	47.5	1,424.1	...	...	1,424.1	700.8	16	5
1978	1,066.1	1,027.9	...	68.7	2,162.7	...	...	2,162.7	949.4	12	5
1979	1,215.6	894.1	138.6	77.7	2,326.0	508.0	59.3	2,893.3	1,146.6	14	6
1980	72.0	272.0	−144.0	105.0	305.0	1,614.0	163.0	2,082.0	654.3	7	3
1981	75.0	105.0	48.0	82.0	310.0	1,321.0	164.0	1,995.0	531.4	7	3
1982	...	...	...	100.0	100.0	1,475.0	171.0	1,746.0	419.6	5	2
1983	...	...	...	...	...	1,427.0	287.0	1,742.0	418.0	4	2
1984	...	...	...	...	...	1,405.0	397.0	1,802.0	432.0	3	1

Source: Central Bank of Ceylon, *Annual Report*, various issues (Colombo: Central Bank of Ceylon, various years).

[a] Based on 1952 rupees.

[b] 4/5 of expenditures during the fiscal year of 15 months—October 1, 1971 to December 31, 1972.

tween 1978/79 and 1981/82, the overall cost of food increased by about 25 percent annually (see Chapter 7). During the same period, the unit cost of rice imports also increased about 20 percent annually.[21] If food stamps were linked to an index of rice prices, the net cost of food stamps would have increased from Rs 1,750 million in 1979 to Rs 4,350 million in 1984. Regular indexing of food stamps to follow rice prices would thus have required 7-9 percent of government expenditures and about 3 percent of the gross national product. The efficient targeting of food stamps would have demanded a much lower proportion of government expenditures than these simulations indicate (this is discussed further below).

A comparison of the actual subsidy with the potential expenditures on the food subsidy under the two assumptions indicates the budgetary savings that the present format of the food stamp scheme may have provided. For example, during the six years of the operation of the present food stamp scheme, elimination of the traditional price subsidies and the rice rationing scheme apparently saved the Exchequer Rs 18.5 billion. These savings would have been reduced by about Rs 5 billion if food stamps had been indexed to changing rice prices.

These are, of course, gross savings. The food stamp scheme was introduced to support the incomes of the poorer households, but steps were also taken to protect wage earners in the organized sector—most of whom are not eligible to receive food stamps—from the effects of eliminating price subsidies on food and other essential commodities. Accordingly, the wages of employees of government institutions and public corporations were increased. For instance, the cost to the government of the higher wage bill for its own employees and lower export duties to permit state corporations to grant wage increases to their workers, has been estimated to have been about Rs 700 million in 1980.[22] Additional salary increases were resorted to in subsequent years along with cost-of-living adjustments. The complexity of the relationships between the rates of inflation and government policy makes it difficult to distinguish the net effect the removal of food price subsidies had on the increased wage payments. It is reasonable to conclude that not all the savings from the curtailed food subsidy were available for investment.[23]

Income Distribution

Whether distributed as price subsidies, subsidized rations, or food and kerosene stamps, all food subsidies redistribute income to some degree. Generally, such redistributive measures are expected to favor the lower segments of the income range and help them to enhance their nutritional welfare, in particular, and overall welfare, in general. The nature of the redistributive measures can be crucial in achieving the desired objectives of such policies. More specifically, the economic efficiency with which a given objective is achieved will vary inversely with the amount of leakage of resources to unintended beneficiaries. Notwithstanding that there is some uncertainty about who the intended beneficiaries are, the discussion in Chapter 4 pointed to fairly large leakages in the subsidy payments under both subsidy schemes. However, under both schemes, a large proportion of the households in the bottommost income/expenditure classes have been beneficiaries. The elimination or reduction of the leakage to higher income households and reallocation to low-income households

[21] Sri Lanka, Department of the Food Commissioner, "The Administration Report."

[22] Central Bank of Ceylon, personal communication.

[23] This conclusion receives further justification from the increased transfer payments made to public corporations since 1979. These transfers to public corporations increased from Rs 920 million in 1979 to Rs 1,958 million in 1983. See Central Bank of Ceylon, *Review of the Economy 1983* (Colombo: Central Bank of Ceylon, 1984).

Table 18—Fiscal costs of the food subsidy under different assumptions, 1979-84

Year	Actual Subsidy	Assumption 1: Subsidy if Price Subsidies and Rations Continued	Assumption 2: Subsidy if Food Stamps Indexed Using Rice Price Index	Total as a Share of Government Expenditures: Actual	Assumption 1	Assumption 2	Total as a Share of GNP: Actual	Assumption 1	Assumption 2
		(Rs million)					(percent)		
1979	2,893	3,101[a]	1,750[b]	14	15	9	6	6	4
1980	2,082	3,721	2,100	7	13	7	3	5	3
1981	1,995	4,465	2,520	7	16	9	3	7	4
1982	1,746	5,358	3,024	5	15	9	2	6	3
1983	1,742	6,429	3,628	4	15	8	2	6	3
1984	1,802[c]	7,714	4,354	3	13	7	1	6	3

Sources: Based on data from Central Bank of Ceylon, *Annual Report*, various issues (Colombo: Central Bank of Ceylon, various years).

[a] On the basis of Rs 2,326 billion reported in Table 17, as the net food subsidy for the first nine months of 1979 before introduction of food stamps; 3,101 = (2,326/9) × 12.

[b] On the basis of the food stamp scheme being followed during all of 1979.

[c] This is larger than the amount of the previous year because the value of kerosene stamps increased.

would obviously increase the incomes of the latter. The possibility of such a modification of the present subsidy program will be discussed in a subsequent chapter.

Given the pattern of distribution of subsidy benefits discussed earlier, one would expect that the food subsidies reduced the inequalities of income distribution. The effect of food subsidies on concentration of income may be examined using the Gini ratio, the commonly used measure. The Gini ratio is expected to lie between 0 and 1. In a given income distribution, a lower value of the Gini coefficient indicates less inequality of income. The Gini coefficients estimated for the income distributions observed during 1978/79 and 1981/82 and the income shares by per capita income quintile are shown in Table 19.

The Gini coefficients and the income shares are estimated for income distributions with and without food subsidies to examine the implicit effect of the subsidies on income inequality. This is a partial analysis, because the "without subsidy" scenario is examined without allowing the resources released from a withdrawal of subsidies to reenter the income distribution. It is clear that under either subsidy scheme, income inequality would have been greater if there were no food subsidies. The income distribution without subsidies would have been more unequal during 1978/79 than during 1981/82, reflecting the large proportion of subsidies in income during the former period. If the subsidies did not exist, the Gini coefficient of the per capita income distribution might have increased from 0.390 to 0.432. The removal of the food stamp scheme might have increased the Gini ratio from 0.408 to 0.428 during 1981/82 under similar assumptions.[24]

Table 19—Gini ratios and income shares with and without food subsidies, 1978/79 and 1981/82

Year/Ratio or Share	With Food Subsidies	Without Food Subsidies
1978/79		
Gini ratio	0.390	0.432
Share of per capita income quintile in total income		
1	0.091	0.072
2	0.128	0.116
3	0.157	0.152
4	0.204	0.210
5	0.417	0.448
1981/82		
Gini ratio	0.408	0.428
Share of per capita income quintile in total income		
1	0.084	0.074
2	0.117	0.112
3	0.147	0.145
4	0.190	0.195
5	0.461	0.473

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

Notes: These figures were calculated using per capita incomes. The 1st quintile had the smallest income; the 5th had the largest. The shares of the per capita income quintiles are calculated as

$$Y_i = (\bar{x}_i \times n_i)/Y,$$

where

Y_i = the share of quintile i in the total income of all households,

$\bar{x}_i$ = the mean per capita income of population in quintile i,

n_i = the total population in quintile i, and

Y = the total income of all households.

[24] It should be noted that the Gini ratios discussed are based on per capita income distributions as a better measure of welfare than household income or spending unit income. According to Central Bank estimates, the Gini ratio based on incomes of income receivers increased from 0.49 in 1978/79 to 0.52 in 1981/82. Similarly, the Gini ratio based on income of spending units increased from 0.44 to 0.45 between the two periods. See Central Bank of Ceylon, *Report on Consumer Finances and Socioeconomic Survey 1981/82.*

6

PATTERNS OF FOOD CONSUMPTION AND NUTRITION BEFORE AND AFTER THE SUBSIDY PROGRAM CHANGE

A striking characteristic of the food stamp scheme is that the nominal value of the food stamps has remained constant from its inception. Underlying this characteristic may be the assumption that changes in economic activities after the post-1977 reforms effectively minimize low-income households' dependence on government transfers. An examination of whether this assumption has been validated empirically is necessary before any change in subsidy policy is made. An understanding of the changes in the relationship between income and food consumption is thus required.

Food Share

Changes in welfare between two periods are reflected in changes in the percentage of total expenditures allocated to food—the food share.

Consider the well-known Engellian relationship between income and the percentage allocated to food. Engel's Law generalizes this relationship, stating that the higher the income, the lower the proportion of income allocated to food. This relationship has been demonstrated empirically. A curve illustrating this relationship, therefore, will show a negative relationship between the proportion spent on food and total outlays or income, as illustrated by curve AB in Figure 1.[25] It shows that the poor allocate a high proportion of their total spendable resources to food, and that as these resources increase, the proportion allocated to food decreases, and larger proportions are allocated to nonfood goods.

However, several scholars have discussed the possibility that Engel's Law may not hold for households at the bottom end of the income range. Poleman has suggested that the abjectly poor will first use an increase in income to increase food intake, leading to an increase in the percentage spent on food as incomes increase up to a point beyond which the customary Engellian relation will begin to manifest itself, and that the turning point may be used to define a "poverty line."[26] The curve CDB in Figure 1 reflects this proposition. Lipton has demonstrated, using survey data from India and northern Nigeria, that the poorest households tend to defy Engel's law; their food needs are so pressing that either they do not reduce the share of food in total outlays, or outlays per person rise.[27] He provides a generalization that the moderately poor sharply reduce the food/outlay ratio as outlays per person increase but the ultra-poor do not.[28] In an analysis of household expenditure data from a survey conducted during 1969/70, Deaton observed that the food share in Sri Lankan households at first tended to rise as outlays increased but flattened out when total outlays were still low.[29]

[25] Total spendable resources—that is, total expenditures—are used as a proxy for income, as a better approximation of permanent income of a household.

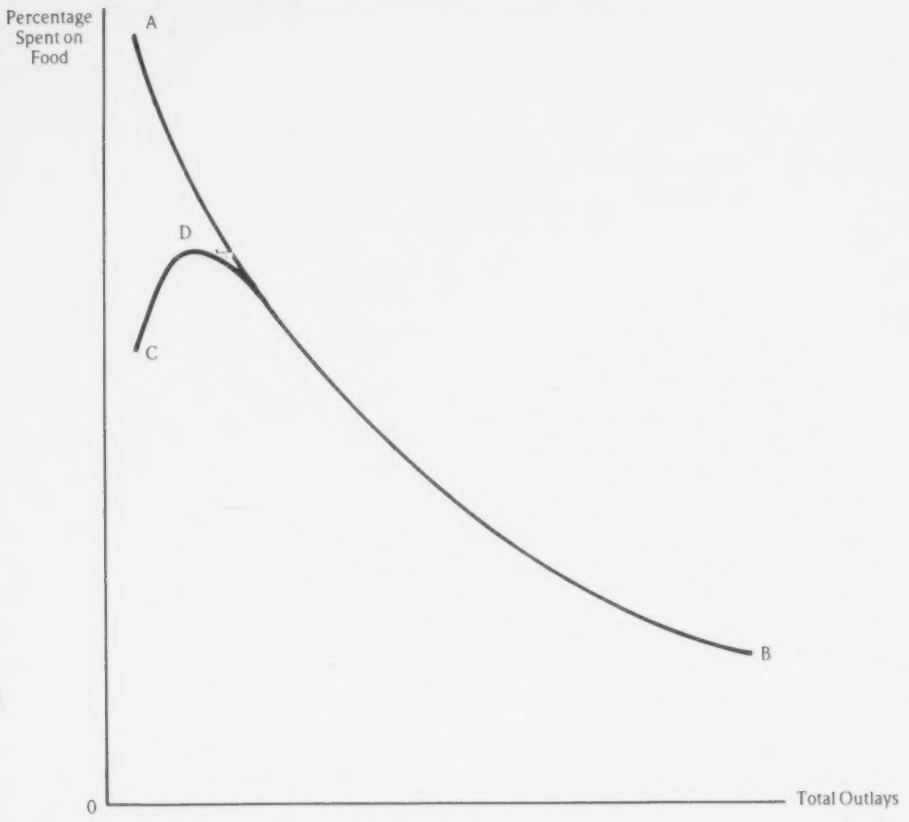
[26] Thomas T. Poleman, "Quantifying the Nutrition Situation in Developing Countries," *Food Research Institute Studies* 18 (No. 1, 1981): 1-58.

[27] Michael Lipton, *Poverty, Undernutrition, and Hunger*, World Bank Staff Working Paper 597 (Washington, D.C.: World Bank, 1983), pp. 35-49.

[28] Ibid., p. 40. Lipton rigorously defines the "ultra-poor" as those who, although spending over 80 percent of their outlays on food, cannot afford 80 percent of average recommended energy allowance; see ibid., p. 35.

[29] See Angus Deaton, *Three Essays on a Sri Lanka Household Survey*, Living Standards Measurement Study Working Paper No. 11 (Washington, D.C.: World Bank, 1981).

Figure 1—Two possibilities for the Engellian relationship



Defiance of the traditional Engel's curve can arise if the very poor have certain fixed commitments that are intrinsic to generating income and to survival, basic needs such as transportation, housing, and clothing. The character of these minimal "fixed costs of survival" may allow the percentage allocated to food to increase sharply as total outlays increase. For example, expenditures such as those on housing and transportation may not vary substantially among households in the bottom 10 to 20 percent of the income range. This allows households, say, in the 10th percentile, to allocate more to food than their counterparts in the 5th percentile. Such increases may occur up to a point such as point D in Figure 1, beyond which the Engel's curve will be as usually expected.[30]

An additional explanation for the ten-

[30] If X is total expenditure and Y is expenditure on nonfood items, the food share, W, is given by $W = (X - Y)/X$. If Y tends to remain constant or changes only minimally with increasing X, as proposed in the discussion above related to low-income households, then W will tend to increase with increasing X. Deaton has discussed how the food share itself may be distorted if total spendable resources include imputed values of goods—such as free housing provided in the estate sector in Sri Lanka—which are higher than their shadow prices to the recipient (see Deaton, *Three Essays*). However, it will not affect the relationship shown above since the imputed values of, say, housing, will be included in both X and Y.

dency of food shares to increase may be found in a shift toward higher cost calories as income increases. Such shifts among the lowest income households may be minimal. Even if such shifts in preferences do occur, they do not explain why the food share begins to be inversely related to income after a point like D in Figure 1.

The positive segment in the Engel's curve may be important to nutrition as well as to other welfare considerations. Expenditure classes falling within this range may form the part of the needy population that social welfare measures should be targeted at in order to achieve the highest returns.

Statistical evidence that there is a positive segment in the relationship between the food share and per capita expenditures was examined using the following functional relationship:

$$\ln Y = a + b \ln x + c(\ln x)^2 + \ln Z + e, \quad (1)$$

where

Y = food share,

x = per capita expenditure level, and

Z = household size.

(ln denotes natural log.)

According to this functional form, if the estimated $b>0$ and $c<0$, then the value of the food share will increase, reach a maximum, and then decrease, with successive increasing values of x. The proportion of households in the expenditure range corresponding to the positive segment of the Engel's curve was estimated after finding the value of expenditures at which the function is at its maximum. The results of estimates, using CFS 1978/79 and CFS 1981/82 data, are given in Table 20.

The results indicate that a segment of the households with the lowest expenditures did increase their food shares when additional incomes were received. During 1978/79, these households were below the 10th percentile of the expenditure distribution. It was only above this expenditure level that the anticipated behavior in the relationship between food consumption and expenditures began to occur. This cut-off point was estimated to be approximately at the 18th percentile of expenditure distribution during 1981/82. Whether the increase from 10 percent in 1978/79 to 18 percent in 1981/82 is statistically significant is difficult to ascertain. It is clear, however, that the proportion of households in abject poverty did not decrease during that period. The general indication is that 10 to 15 percent of the households are in abject poverty and that any food-related income transfer to them would involve the smallest leakages to nonfood consumption.

Table 20—Estimates of the food share function, 1978/79 and 1981/82

Explanatory Variable	1978/79	1981/82
Intercept	−2.52	−4.46
	(26)	(39)
Log of per capita expenditures	1.18	1.75
	(34)	(45)
Log of per capita expenditures squared	−0.15	−0.18
	(45)	(53)
Log of household size	−0.08	−0.06
	(17)	(15)
R^2	0.61	0.58

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

Note: The t ratios are given in parentheses.

Changes in the food share between 1978/79 and 1981/82 are shown in Table 21. The food shares of different expenditure classes in both periods clearly show the dominance of food in household budgets, even among upper-income classes. Nationally, all expenditure classes spend more than 50 percent of their spendable resources on food. Those in the urban sector had the lowest average propensity to consume food, and those in the estate sector had the highest.

A comparison of food shares in the two periods indicates that the food shares of the

Table 21—Proportion of expenditures allocated to food consumption, by sector and expenditure quintile, 1978/79 and 1981/82

Year/Sector	Per Capita Expenditure Quintile					
	1	2	3	4	5	All
1978/79						
Urban	0.75	0.70	0.65	0.62	0.46	0.61
Rural	0.75	0.71	0.67	0.62	0.50	0.66
Estate	0.76	0.74	0.74	0.71	0.65	0.72
All	0.75	0.71	0.68	0.64	0.50	0.66
1981/82						
Urban	0.75	0.72	0.70	0.64	0.48	0.62
Rural	0.75	0.73	0.70	0.67	0.55	0.69
Estate	0.78	0.76	0.76	0.74	0.65	0.74
All	0.75	0.73	0.71	0.67	0.53	0.68

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

Note: The 1st quintile had the smallest expenditures; the 5th had the largest.

lowest expenditure classes remained stable, whereas those of the higher expenditure classes increased (these increases were found to be statistically significant). Stability of food shares over a period does not necessarily mean stability of nutritional welfare. As shown later in this chapter, there was a significant reduction in calorie intake of the lowest expenditure classes between 1978/79 and 1981/82. The marginal increases in the food shares of middle- and upper-expenditure classes appear to be incompatible with the high rates of growth of the economy during this period. Total outlays on food can increase following an increase in relative price of food, if the demand for food is inelastic. (Calorie consumption was found to be stable during this period. See below.) However, the food share may remain stable, decrease, or increase, depending on how increases in income, if there are any, lead to increased total expenditures. The period during which the two household surveys were conducted had certain special characteristics that may have dampened nonfood expenditures during 1981/82. It is likely that the pent-up demand for durables and semidurables may have been met in the years of import liberalization, which began in late 1977. Expenditures on these goods by higher income classes may have been somewhat less intense by 1981/82 (see Appendix 2).

Calorie Consumption

The methodology used to collect food consumption and expenditure data and the range of food items covered in the two Central Bank surveys, CFS 1978/79 and CFS 1981/82, are practically identical. The figures reported for food consumption were transformed to calorie equivalents using conversion factors recommended by the Sri Lanka Medical Research Institute of Sri Lanka (see Appendix 4 for a discussion of the estimation of calorie consumption). Per capita calorie consumption and other related statistics reported have been computed for the household. Average per capita calorie consumption may be computed either for the household, in which case

Per capita household calorie consumption

$$= 1/H \sum_{h=1}^{H} (C_h/N_h), \qquad (2)$$

where

C = calories,

h = individual household,

H = sum of all households, and

N = number of individuals;

or for the individual, in which case

Per capita calorie consumption

$$= (1/\sum_{h=1}^{H} N_h) \sum_{h=1}^{H} N_h(C_h/N_h). \qquad (3)$$

Results of the two methods may not be the same because the method for the households is not weighted at the household level.

The method for the household is used in this analysis.

A comparison of national per capita calorie consumption figures for 1978/79 and 1981/82 shows no statistically significant difference (Table 22).[31] Average per capita consumption of calories during both periods—2,283 per day in 1978/79 and 2,271 per day in 1981/82—are higher than the figure recommended for an average Sri Lankan, 2,200 calories per day.[32]

With regard to mean calorie consumption in the three sectors, the estate sector appears to have been affected most by the price changes between the two periods. Average consumption in the estate sector was 2,639 calories during 1981/82, nearly 5 percent less than the average consumption of 2,763 calories in 1978/79. It is difficult to estimate how much such a decline may have affected the nutrition of these households, because there are no sector-specific nutritional norms. These and other surveys have consistently indicated that calorie consumption in the estate sector was higher than in the other two.[33] The energy intake may have been raised by the occupational requirements and climatic characteristics of the estate sector and by limited demand for nonfood expenditures such as transportation and housing.

Mean calorie intake also declined, negligibly, in the urban sector. In the rural sector, where vast increases in agricultural production occurred in the period under consideration, calorie consumption increased.

Of greater relevance to the income transfer program than mean intake is the distribution of calorie intake by income. Table 23 shows that the nutritional position of the bottom two deciles had deteriorated substantially by 1981/82. (See Appendix 1, Table 43 for adult equivalent calorie consumption by expenditure class.) The reduction in the mean number of calories of the bottom decile was around 155 calories, about 12 percent of the mean in 1978/79. In the second decile, the reduction was 105 calories (or 6 percent of the mean in 1978/79). Mean consumption in the third decile also deteriorated, although to a lesser degree—3 percent from the mean in 1978/79. In contrast are the increases observed in the upper expenditure classes (except the highest decile, which showed a decline of about 2.5 percent from an already high level). The middle income classes were able to sustain or slightly improve their nutritional welfare. Although the lower income classes maintained their shares of expenditures allocated to food, as seen in the earlier discussion, the absolute number of calories that allocations could purchase was significantly lower in 1981/82 than in 1978/79.

Poorer households may have little or no flexibility in shifting their budget shares. Their nonfood expenditures arise from meeting basic needs, such as clothing, housing, and transportation. These minimum

Table 22—Apparent mean calorie consumption, by sector, 1978/79 and 1981/82

Sector	1978/79	1981/82
	(calories/capita/day)	
Urban	2,240	2,229
Rural	2,230	2,246
Estate	2,763	2,639
All	2,283	2,271

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

[31] Calorie consumption is compared on a per capita basis. Given the proximity of the two periods under comparison, changes in household composition are not expected to be significant.

[32] Sri Lanka, Department of Census and Statistics, *Socioeconomic Survey of Sri Lanka 1969/70, Special Report on Food and Nutritional Levels of Sri Lanka* (Colombo: Department of Census and Statistics, 1972).

[33] According to the Socioeconomic Survey of 1969/70 (ibid.), mean calorie consumption in the urban sector was 2,161; in the rural sector, 2,268; and in the estate sector, 2,459. According to Sri Lanka, Department of Census and Statistics, "Labour Force and Socioeconomic Survey 1980/81," Colombo, 1983, mean calorie consumption in the urban sector was 2,095; in the rural sector 2,257; and in the estate sector, 2,400.

Table 23—Apparent per capita daily calorie consumption by expenditure decile and sector, 1978/79 and 1981/82

Year/Sector	Per Capita Expenditure Decile									
	1	2	3	4	5	6	7	8	9	10
	(calories/capita/day)									
1978/79										
Urban	1,288	1,620	1,718	1,824	1,917	2,079	2,260	2,495	2,674	3,181
Rural	1,346	1,663	1,855	1,999	2,155	2,385	2,505	2,757	3,071	3,336
Estate	1,324	1,821	2,027	2,222	2,490	2,716	3,032	3,160	3,884	3,845
All	1,335	1,663	1,848	1,994	2,157	2,377	2,528	2,738	3,054	3,296
1981/82										
Urban	1,137	1,351	1,589	1,784	1,927	2,088	2,216	2,484	2,705	2,882
Rural	1,186	1,586	1,813	2,031	2,184	2,392	2,581	2,869	3,203	3,475
Estate	1,214	1,607	1,924	2,122	2,371	2,687	3,024	3,344	3,783	3,549
All	1,181	1,558	1,794	2,008	2,168	2,373	2,553	2,838	3,120	3,216

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The 1st decile had the smallest expenditures; the 10th had the largest.

costs cannot be reduced further without threatening survival. While it is not possible to quantify the loss in welfare due to price increases in nonfood amenities, the nutritional loss is clearly indicated here.

Notwithstanding the somewhat limited comparability of CFS 1978/79 or CFS 1981/82 data with a set of data gathered by the Department of Census and Statistics on food consumption and socioeconomic status of households during 1980/81, Figure 2 shows that most households in the bottom three deciles were unable to recover from the impact of price changes that occurred during 1979/80.[34] While about 70 percent of other households improved their calorie consumption from the relative deterioration seen in 1980/81, the opposite seems to have happened to the bottom 20 to 30 percent.

The rural sector seems to have experienced the smallest amount of adverse effects from price and income changes (Table 23). Significant reductions in calorie consumption appear to have been confined to the bottom 20 percent. The calorie consumption of households in this quintile registered a decline of about 8 percent in calorie consumption compared with 1978/79. The calorie consumption of their counterparts in the urban and estate sectors fell more—13 percent and 10 percent, respectively.

Urban and estate households in the second quintile—deciles 3 and 4—also had their nutritional welfare reduced about 5 percent. In the estate sector, such reductions also appear in the fifth decile. Changes in wheat flour prices may have been significant in seriously depleting calorie consumption in the estate sector. In 1978/79, calories from wheat flour constituted a third of the average number of calories consumed by estate households. By 1981/82, wheat flour prices had more than doubled, and consumption fell by over 25 percent.

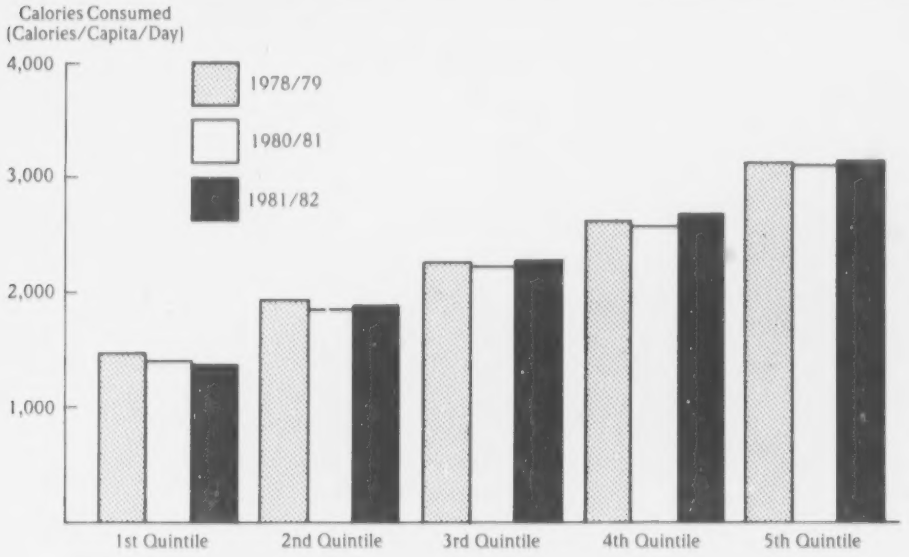
The Existence of the "Ultra-Poor"

Moving away from the averages, the extent of nutritional poverty among households can be assessed using Lipton's criterion of the "ultra-poor."[35] Ultra-poor households are those consuming less than 80 percent

[34] For a description of this survey and an analysis of data therein, see David E. Sahn, "The Effect of Price and Income Changes on Food Energy Intake in Sri Lanka," in *Economic Development and Cultural Change*, forthcoming.

[35] Lipton, *Poverty, Undernutrition, and Hunger.*

Figure 2—Per capita calorie consumption, by expenditure quintile, 1978/79, 1980/81, and 1981/82



Sources: The basic data for 1978/79 are from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape). The data for 1980/81 are compiled from David Sahn, "The Effect of Price and Income Changes on Food-Energy Intake in Sri Lanka," *Economic Development and Cultural Change*, forthcoming. The basic data for 1981/82 are from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

Notes: The 1st quintile had the smallest expenditures; the 5th had the largest.

of recommended calorie allowance although more than 80 percent of their expenditures are used to purchase food. The percentage of households falling into this category is shown by expenditure class in Table 24. The percentage of ultra-poor households in all households increased from 4.6 percent in 1978/79 to 6.0 percent in 1981/82. This increase, though small, was statistically significant. The highest proportion of the ultra-poor is in the poorest quintile, as would be expected, and a worsening of nutritional poverty in this quintile by 1981/82 is clearly indicated.

The new policy package envisaged substantial growth in agricultural production, particularly production of nonexport crops, the most important of which is paddy. In fact, agricultural performance under the new policy regime has been noteworthy. Between the 1976-78 and 1980-82 periods, agricultural gross domestic product (GDP) grew at an average annual rate of 4.36 percent, with paddy production growing at an annual rate of 7.9 percent.[36] Comparative rates of growth during the previous 7 years were 1.85 for agricultural GDP and 1.4 for paddy production. This increase of agricultural production may have been aided by the removal of constraints on transportation and the supply of inputs, increased demand for domestic agricultural products—particu-

[36] Erik Thorbecke and Jan Svejnar, "Effects of Macroeconomic Policies on Agricultural Performance in Sri Lanka, 1960-81," prepared for the OECD Development Center, Paris, 1984.

Table 24—Share of households that are "ultra-poor", by expenditure quintile, 1978/79 and 1981/82

Per Capita Expenditure Quintile	1978/79	1981/82
	(percent)	
1	19.5	25.0
2	2.5	3.9
3-5	. . .[a]	. . .[a]
All	4.6	6.0

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

Notes: Ultra-poor households are those households that consume less than 40 percent of the recommended calorie allowance even though they allocate more than 40 percent of their expenditures to food. The 1st quintile had the smallest expenditures; the 5th had the largest.

[a] Incidence is zero or negligible.

larly due to the removal of price subsidies on imported wheat flour—favorable weather, and larger agricultural investments. The overall growth of the economy has also been remarkable; the GDP grew at rates of 8.2 percent (1978), 6.3 percent (1979), and 5.8 percent (1980 and 1981), with the contribution of agriculture outstanding.[37]

How were the poorer agricultural households affected by the expansion of economic activity? If the final effect can be seen through the incidence of ultra-poverty, Table 25 indicates that agricultural workers, both in the domestic and export sectors, are worse off. Their poverty rates were significantly greater in 1981/82 than in 1978/79. Even among farming households, a slight deterioration is indicated.

Discussion

Any inferences about changes in nutritional welfare between two periods are plagued by problems of standardization. These problems get compounded when the indicator used is the apparent daily per capita calorie consumption. A reasonable comparison would require standardization of at least the more important determinants of variability in food supplies and consumption. These include technology, weather, input supplies, administered prices, internal and external trade, data bases, and perhaps changes in preferences. Fortunately, the comparisons discussed in this study are not affected by the major problems of standardization because the data bases are compara-

Table 25—Share of agricultural households that are "ultra-poor", 1978/79 and 1980/82

Occupational Group	Poorest 20 Percent of Households		All Households	
	1978/79	1981/82	1978/79	1981/82
		(percent)		
General farmers	15.8	17.8	3.0	3.2
Plantation workers	14.0	23.8	3.2	6.3
Agricultural workers (mainly paddy)	23.8	36.7	10.8	15.4

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

[37] World Bank, "Economic Adjustments in Sri Lanka: Issues and Prospects," Washington, D.C., May 1982.

ble to a high degree and the two periods under comparison are close. The feature that best distinguishes the two periods vis-à-vis food supplies and consumption is the policy change on price subsidies and ration issues.

The most reliable of the components of food availability recorded in annual food balance sheets are those for rice, both imports and domestic production, and wheat flour, all of which is imported. Despite drought during one season in 1982, the per capita availability of calories from rice was 7 percent greater in 1981/82 than in 1978/79.[38] Domestic rice production increased by 9 percent per capita, whereas imports declined by 25 percent, mostly because of the deletion of the ration requirements. The weight of imports in the total supply of rice was 13 percent in 1978/79. Calories from wheat flour, on the other hand, declined dramatically, by 31 percent. Reductions in the consumption of wheat flour and wheat flour products explain most of the calorie consumption reductions of the lower income classes in 1981/82.

[38] Sri Lanka, Department of Census and Statistics, "Food Balance Sheets," Colombo, 1978, 1979 (mimeographed).

7

INFLATION AND THE REAL VALUE OF FOOD STAMPS

A basic difference between the food stamp scheme and the rice rationing scheme is that the value of food stamps is not indexed to changes in the cost of the foods that are to be purchased with them. Under the rice rationing scheme, indexing was automatic because a certain quantity of rice was issued free of charge. The primary reason why food stamps are not indexed may be the need to gradually decrease the share of government transfers in total expenditures and to divert the savings to investment. As noted earlier, economic growth itself was expected to reduce the dependence on government transfers. An implication of this is that the welfare losses from price increases may have been expected to be offset by increases in income and through substitutions.

Substitutions do occur as prices and income change. This makes it difficult to develop a "true" cost-of-living index empirically. The commonly used Laspeyres index, for example, uses price changes in a basket of goods in a base period to infer welfare changes stemming from price changes in a later period. However, the relative prices of goods within the basket, and the composition of the basket of goods as well, may have undergone changes in the second period so that the consumer can maintain similar levels of perceived welfare. An example would be substitution of a low-cost calorie source for a high-cost source, when relative prices favor such a change, to maintain the perceived benefits of consumption. Or nonfood consumption could be reduced and food consumption increased to minimize deterioration of nutritional welfare. A comparison of the final count of calories consumed during two periods would provide a reasonable reflection of the effect of all price and income changes, with the consequent adjustments made.

Price Changes

In this analysis, unit prices of different foods were derived by dividing the expenditures by quantities purchased (see Table 26). These imported prices correspond to administered prices, such as those on wheat, and prices published by the Central Bank.[39] Food items that did not contain information on the quantity in a unit, such as meals purchased and consumed away from home, were not included in the analysis. Changes in the prices of nonfood items were examined through five representative nonfood categories: housing, fuel, cloth, transportation, and miscellaneous. The price of housing was estimated by dividing expenditures on housing reported in the surveys by square meters of the floor area of the dwelling. Fuel was represented by the price of kerosene, cloth by the price of Batticaloa sarongs, and transportation by the car hire charges for a kilometer. These representative prices were obtained from the Central Bank's *Price and Wage Statistics* for the relevant years.[40] For the miscellaneous component, the price index for the miscellaneous group in the commodity-wise price indexes published by the Central Bank was used.[41]

Prices have increased most for wheat and wheat products. These foods, which constituted about 7 percent of the total

[39] Central Bank of Ceylon, *Price and Wage Statistics, Retail, Producer, and Input Prices and Wages* (Colombo: Central Bank of Ceylon, 1981 and 1982).

[40] Ibid.

[41] Central Bank of Ceylon, *Annual Report*, various issues (Colombo: Central Bank of Ceylon, various years).

Table 26—Price and budget shares of major food and nonfood commodities, 1978/79 and 1981/82

Commodity	Units	1978/79			1981/82		
		Quantity	Price	Budget Share	Quantity	Price	Budget Share
			(Rs)	(percent)		(Rs)	(percent)
Food							
Rice	kilograms	7.94	3.58	18.6	8.95	6.09	20.4
Wheat	kilograms	1.65	2.56	2.7	0.97	6.66	2.4
Bread	kilograms	2.45	2.38	3.8	1.60	6.02	3.5
Grains	kilograms	0.09	2.48	0.2	0.13	4.73	0.3
Cereal preparations	kilograms	0.21	9.42	1.0	0.17	22.73	1.0
Meat	kilograms	0.22	4.77	1.2	0.24	7.03	1.1
Fish	kilograms	0.93	10.57	5.1	0.98	17.86	5.1
Roots	kilograms	0.37	1.79	0.3	0.87	2.83	0.8
Vegetables	kilograms	3.11	2.36	4.8	2.82	4.56	5.1
Pulses	kilograms	0.25	6.26	1.3	0.23	9.98	1.2
Condiments	kilograms	1.02	10.97	6.2	1.00	17.26	5.6
Coconuts	numbers	8.34	0.91	4.9	8.33	1.56	4.8
Sugar	kilograms	0.92	7.00	3.9	0.99	13.80	4.8
Oil	liters	0.22	6.04	1.0	0.23	11.30	1.1
Milk	liters	0.80	4.93	1.7	0.73	24.70	1.9
Fruit	kilograms	0.37	1.74	0.6	0.51	7.26	0.7
Beverages	liters	0.13	13.51	1.1	0.14	23.47	1.1
Nonfood							
Housing[a]	...	...	1.16	5.2	...	1.68	5.0
Fuel[b]	...	...	0.76	4.8	...	4.22	6.4
Cloth[c]	...	...	37.10	7.0	...	43.91	4.6
Transportation[d]	...	...	4.05	2.8	...	10.09	2.9
Miscellaneous[e]	...	...	246.09	14.2	...	370.22	12.9

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

[a] The price of a square meter of floor area is used as a proxy for the price of housing.

[b] The price of a liter of kerosene is used as a proxy for the price of fuel.

[c] The price of a Batticaloa sarong is used as a proxy for the price of cloth.

[d] The car hire charge for a kilometer is used as a proxy for the price of transportation.

[e] These figures use the price index for miscellaneous goods published by the Central Bank.

budget of a representative household, increased about 155 percent between the two periods. The other most affected item, though it had a smaller proportion of the total budget, was milk. It registered a 400 percent increase. The increase in rice prices, the most important single item in the average household budget, was about 70 percent. Most other price increases on domestically produced foods were in line with the price change for rice.

The most seriously affected nonfood item was fuel, the price of which increased by 450 percent. The cost of transportation, which increased by 150 percent, reflects the changes in gas prices that were effective by the mid-1980s. Least affected by the inflationary trend was cloth, the price of which increased only 18 percent. The price of a Batticaloa sarong, a locally produced men's garment, was selected to represent cloth, but it may have given an underestimation of the changes in cloth prices brought about by devaluation of the domestic currency. The change in the price of miscellaneous goods is expected to represent changes in the price of durables.

Price indexes for food, nonfood, and all commodities are given in Table 27. These are Laspeyres-type indexes that use the ratio of the expenditures required to purchase a given bundle of goods in 1978/79 to the

Table 27—Cost-of-living indexes for 1981/82, with 1978/79 as the base year, by expenditure quintile

Per Capita Expenditure Quintile	Food	Nonfood	All
1	1.89	2.48	2.05
2	1.94	2.20	2.02
3	1.96	2.13	2.02
4	1.99	2.02	2.00
5	2.00	1.76	1.85
All	1.94	1.91	1.92

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

Notes: These indexes are Laspeyres indexes, based on the prices of commodities and the quantities purchased by households. The index for each household is derived first and the mean indexes are derived by dividing the sum of the household indexes by the total number of households. The 1st quintile had the smallest expenditures; the 5th had the largest.

expenditures required to purchase the same bundle at 1981/82 prices.[42] The estimated indexes are constructed using cross-section data that incorporate most socioeconomic and geographic variations in prices and expenditures, maximum commodity coverage, and income-class specificity.[43] The overall index shows that the prices of the bundle of commodities that an average household consumed in 1978/79 increased 92 percent by 1981/82. Food prices increased by 94 percent and nonfood prices by 91 percent. These increases are substantially larger than those shown by the official cost-of-living index. Based on the official indexes published by the Central Bank, the weighted indexes for 1981/82 relative to 1978/79 show only a 65 percent increase in the overall index, with a 70 percent increase for food and a 55 percent increase for nonfoods.

Low-income households faced somewhat higher cost-of-living changes than high-income households did. This was because indexes for nonfood goods faced by the low-income households were relatively high. Price indexes are determined by the shares of each component in the total budget in the base period and the price changes after. Some components, such as fuel, which had large shares in the budgets of low-income households (Table 28), also had the largest price increase. Price increases were lowest for items for which high-income households allocated the most and low-income households allocated the least. Miscellaneous goods, in which durables figure prominently, is a case in point. Similar cases are housing and clothing. Given the nature of budgetary allocations among the low-income households, no income-class-specific price index will fail to reflect the deleterious effects that price increases for basic commodities have on these households.

Real Value of Food Stamps

The deflators shown in Table 27 indicate that the real value of the food stamps received by low-income households in 1981/82 was a little more than 50 percent of the original value. It was 60 percent of the original value if the overall deflator of 1.65 from the Colombo Consumers' Price

[42] The Laspeyres index, L, is derived as follows:

$$L = \left(\sum_{i=1}^{k} P_i^1 Q_i^0 / \sum_{i=1}^{k} P_i^0 Q_i^0\right) = \sum_{i=1}^{k} (P_i^1/P_i^0) W_i,$$

where P_i^1 = price of commodity i in 1981/82; P_i^0 = price of commodity i in 1978/79; W_i = weight of commodity i in 1978/79; and Q_i^0 = quantity of commodity i in 1978/79.

[43] The Colombo Consumers Price Index, the only available published price index, is constructed by the Department of Census and Statistics and published by the Central Bank. It is based on a set of household expenditures of working class households in the Colombo municipality area.

Table 28—Budget shares of nonfood commodities, by expenditure quintile, 1978/79 and 1981/82

Commodity/Year	Per Capita Expenditure Quintile					
	1	2	3	4	5	All
	(percent)					
Housing						
1978/79	4.4	4.5	4.8	5.3	7.0	5.2
1981/82	3.6	3.9	4.3	5.0	7.8	4.9
Fuel						
1978/79	5.9	5.2	4.9	4.4	3.4	4.8
1981/82	8.1	7.1	6.4	5.8	4.5	6.3
Cloth						
1978/79	4.5	6.4	7.1	8.2	8.9	7.0
1981/82	3.1	4.0	4.6	5.2	6.0	4.6
Transportation						
1978/79	1.9	2.3	2.4	3.0	4.4	2.8
1981/82	1.6	2.0	2.7	3.1	5.0	2.9
Miscellaneous						
1978/79	7.7	10.0	12.2	15.3	25.5	14.1
1981/82	7.7	9.4	10.5	13.4	23.3	12.8

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The 1st quintile had the smallest expenditures; the 5th had the largest.

Index is used, and 58 percent if the rice price index of 1.70 is used (Table 27). A calorie price index, as defined and estimated in the section below, puts the real value of food stamps in 1981/82 at around 56 percent of its original value. In other words, a properly indexed food stamp scheme should have given the beneficiaries in low-income households a food stamp benefit of between Rs 30 and Rs 36, per capita, in 1981/82.

Price Changes and Substitutions

To what degree did substitutions between food and other goods and substitutions among foods mitigate the real income losses due to inflation? In fact, the promotion of substitutions to reflect resource availability was a primary objective of the removal of price distortions in the economy.

A comparison of the changes in the unit price of calories with the changes in the food price index may be a useful indicator of the degree to which calorie sources are substituted for each other. For this purpose, the calorie price index, defined as the ratio of the price of calories in 1981/82 (Period 1) to the price of calories in 1978/79 (Period 0), and the food price index, defined earlier, could be used. The relationship between the calorie price index and the food price index can be summarized as follows: For a given quantity of calories consumed in the base period 0, that is, C_0,

$$Z = [(C_0P_c^1/C_0P_c^0)/\sum_{i=1}^{k} W_i^0(P_i^1/P_i^0)]$$

$$= \frac{\text{Calorie Price Index}}{\text{Food Price Index}} \gtreqless 1 \qquad (4)$$

where

Z = ratio of calorie price index to food price index,

P_c^1, P_c^0 = unit price of calories in period 1 or period 0,

W_i^0 = share of a food item, i, in the total food budget in period 0, and $i = 1 \ldots k$, and

P_i^1, P_i^0 = price of commodity i in period 1 or 0.

Several implications follow from this. If $Z<1$ or $Z>1$, then W_i^0 might not equal W_i^1, at least for some W_i. But if $Z = 1$, W_i^0 might equal W_i^1. If $Z<1$, that is, if the calorie price index is less than the food price index, "calorie-efficient" substitutions will have taken place.

Some implications also follow for C_0, calorie consumption in period 0, and C_1, calorie consumption in period 1. If $Z = 1$ and $C_0 = C_1$, then there would have been no substitutions, and income increases would have offset the real income losses from inflation. If $Z<1$ and $C_0>C_1$, then, in spite of "calorie-efficient" substitutions, income increases would not have compensated for the losses in real income from inflation. If $Z<1$ and $C_0 = C_1$, then "calorie-efficient" substitutions alone or substitutions associated with income increases would have maintained nutritional intake. If $Z>1$ and $C_0<C_1$ or $C_0 = C_1$, then income increases would have allowed movement to higher-cost calorie sources, that is, would have allowed greater sophistication in diet, without reducing the original calorie intake. Lastly, if $Z>1$ and $C_0>C_1$, "calorie-inefficient" substitutions have taken place. These relationships should be considered under the assumptions that during the period of observation, no changes occurred in tastes, preferences, or energy requirements.

Indexes at the national mean in Table 29 indicate that, overall, "calorie-efficient" substitutions were made. The near-equality in average calorie consumption shows that the substitution effects together with income effects kept nutritional welfare at the average. Substitutions among calorie sources reduced the final food expenditures required to purchase the same number of calories under new prices by about 7 percent.[44]

Among expenditure classes, similar calorie-efficient substitutions are indicated. Changes in nominal incomes in the bottom quintile were not large enough to compensate for the real income losses from price changes. Hence, a smaller number of calories was consumed per capita per day in 1981/82 than in 1978/79.

The rural sector has usually had a greater potential for substitutions among calorie sources than the other two sectors, particularly within the starchy staples group. And it did have the largest degree of calorie-efficient substitutions. These substitutions, reinforced by increased incomes, either maintained or increased calorie consumption except in the lowest expenditure class. The degree of substitution was lower in the other two sectors, and lowest in the urban sector. The combination of a calorie-inefficient substitution with a deterioration in calorie consumption was found only for the lowest income class in the urban sector. A combination of factors may have contributed to this, including insufficient increases in incomes, a limited ability to shift resources from nonfood to food, and, perhaps, bottlenecks in the supply of cheaper calories.

[44] From Table 29, a crude estimate of the degree of substitution may be derived as: $(1.94 - 1.80)/1.94 = 0.07$.

Table 29—Calorie consumption and price and calorie and food price indexes, by sector and expenditure quintile

Per Capita Expenditure Quintile/Sector	Calories Consumed		Calorie Price		Calorie Price Index	Food Price Index	Ratio of the Calorie Price Index to the Food Price Index
	1978/79	1981/82	1978/79	1981/82			
	(calories/capita/day)				(Rs/1,000 calories)		
Urban							
1	1,449	1,254	1.2825	2.5390	1.97	1.93	1.020
2	1,756	1,674	1.4724	2.7151	1.84	1.97	0.934
3	1,994	2,005	1.5532	2.8922	1.86	2.04	0.911
4	2,362	2,340	1.6270	3.0664	1.88	1.99	0.945
5	2,950	2,803	1.9560	3.6680	1.88	2.06	0.913
All	2,240	2,229	1.6370	3.1460	1.92	1.99	0.964
Rural							
1	1,493	1,330	1.2393	2.2158	1.79	1.88	0.952
2	1,922	1,915	1.3360	2.3691	1.77	1.92	0.922
3	2,257	2,276	1.4082	2.5188	1.79	1.94	0.923
4	2,609	2,701	1.4915	2.6878	1.80	1.94	0.928
5	3,167	3,304	1.7094	2.9868	1.75	1.99	0.879
All	2,230	2,246	1.4190	2.5270	1.78	1.92	0.925
Estate							
1	1,648	1,473	1.1912	2.3024	1.69	1.87	0.904
2	2,120	2,014	1.2813	2.3476	1.82	1.91	0.953
3	2,592	2,541	1.3144	2.4472	1.86	1.95	0.954
4	3,064	3,175	1.4226	2.5488	1.78	2.05	0.868
5	3,852	3,700	1.5024	2.7170	1.80	1.93	0.932
All	2,763	2,639	1.3580	2.4730	1.82	1.92	0.947
All							
1	1,490	1,368	1.2456	2.2571	1.81	1.89	0.957
2	1,914	1,894	1.3442	2.4193	1.79	1.94	0.922
3	2,256	2,264	1.4210	2.5660	1.80	1.96	0.918
4	2,612	2,678	1.5118	2.7462	1.80	1.99	0.904
5	3,152	3,154	1.7782	3.2044	1.80	2.00	0.900
All	2,283	2,271	1.4600	2.6300	1.80	1.94	0.927

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

Note: The 1st quintile had the smallest expenditures; the 5th had the largest.

8

IMPACT OF FOOD STAMPS ON NUTRITION AND COST-EFFECTIVENESS

The effect of government transfers on the nutritional welfare of recipients can be evaluated through their effect on energy intake. The focus will be on the calorie-deficient groups who were to be the targets of subsidies after the policy changes of 1978 and 1979.

Subsidies in Food Budgets

As Table 30 shows, the total subsidy received through rice rations and other food price subsidies constituted a quarter of the food budget of the average rice ration recipient during 1978/79. This contribution was halved under the food stamp scheme. For the beneficiaries in the lowest expenditure classes, who spend less on food in absolute terms, the subsidies are of greater importance. Subsidies made up 32 percent of the food expenditures of the lowest quintile in 1978/79 and 20 percent in 1981/82. In 1978/79, the contribution of the subsidy was 16 percent for the highest expenditure class, whereas by 1981/82 the share had dropped to around 5 percent, reflecting the effect of the removal of general price subsidies. The pattern followed by subsidies in the food budgets of households in the three sectors was the same pattern they followed in the total budgets, discussed in Chapter 4.

The Marginal Propensity To Consume out of Subsidy Income

Food consumption by needy households may be increased by providing cash transfers or by issuing certain quantities of food these households usually consume at a price lower than the market's. At the extreme, such quantities may be issued free of charge, as rice was during 1978/79. Cash transfers may be related to food, in the form of food stamps, for example. In Sri Lanka, regulations governing the food stamp scheme allow recipients to deposit unused food stamps in Post Office savings accounts. Until January 1979, the food stamp scheme in the United States required that certain purchases be made from the recipient's own funds before food stamps could be used.[45] Nevertheless, at no time were encashments permitted.

Conceptually, if the value of the transfer received is less than what the recipients spend on food, the proportion of an additional rupee spent on food—the marginal propensity to consume—should be the same whether the additional rupee is received from the subsidy transfer or from cash earnings. Here, the subsidy transfer is inframarginal and does not restrict the food expenditures. The subsidy transfer may be extramarginal if the subsidy received is greater than the amount of food expenditures that recipients would have made before receiving the subsidy. In this situation, the effect of subsidy income on food expenditures would be different from the effect of normal cash earnings.

Studies of the U.S. food stamp program have indicated that subsidy transfers can have a larger marginal effect on food expenditures than do normal cash incomes. In almost all the studies, the marginal propensity to expend on food out of subsidy income is more than double that estimated

[45] Larry Salathe, "Impact of Elimination of the Food Stamp Program's Purchase Requirement on Participants' Food Purchases," *Southern Journal of Agricultural Economics* 12 (1980): 87-92.

Table 30—Share of food subsidies in food budgets of recipients by sector and expenditure quintile, 1978/79 and 1981/82

Sector/ Year	Per Capita Expenditure Quintile					
	1	2	3	4	5	All
	(percent)					
Urban						
1978/79	34.8	25.0	21.9	18.0	15.8	25.5
1981/82	17.4	12.2	8.7	7.7	6.0	11.4
Rural						
1978/79	31.8	26.1	22.1	18.6	16.8	25.4
1981/82	20.6	13.3	9.3	7.3	5.5	13.6
Estate						
1978/79	33.3	26.9	25.5	23.5	14.2	25.7
1981/82	12.9	10.4	6.4	5.8	4.4	9.3
All						
1978/79	32.4	25.9	22.2	18.8	16.5	25.4
1981/82	20.2	13.1	9.2	7.3	5.6	13.2

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

Note: The 1st quintile had the smallest expenditures; the 5th had the largest.

for normal cash income.[46] The major explanation for these differences is that there are low-income households for whom the transfers are extramarginal. These households usually have high marginal propensities to spend on food out of income. Senauer and Young have recently shown that even households with food expenditures greater than the subsidy income could have significant differences between the marginal effects of the two sources of income.[47]

Under the rationing scheme (1978/79) and the food stamp scheme (1981/82), the subsidy transfers in Sri Lanka were almost wholly inframarginal. Would the form food subsidies took during these periods have enabled more food/calorie consumption at the margin than a normal cash transfer would have allowed? In the model specified below, the marginal propensities to consume food (calories) or to spend income on food are treated as differing by the source of income, whether it is from food subsidies or from incomes from all other sources. The hypothesis tested is that there is no such difference. The statistic to test whether the hypothesis is to be rejected or accepted is the F-ratio between the sum of squares of the regression run under the model and the sum of squares of the regression run under the hypothesis, adjusted for degrees of freedom.[48]

The Model

The model for this test is

$$C = \alpha + \beta_1(Y - S) + \beta_2(S) + \delta_{11}(Y - S)^2 + \delta_{12}(Y - S)(S) + \delta_{22}(S)^2 + e;$$

$$\partial C/\partial(Y - S) = \beta_1 + 2\delta_{11}(Y - S) + \delta_{12}(S);$$

$$\partial C/\partial(S) = \beta_2 + \delta_{12}(Y - S) + 2\delta_{22}(S); \quad (5)$$

where

Y = total household expenditures,

S = household subsidy income, and

C = household calorie consumption or food expenditures.

The hypothesis to be tested is either

$$\beta_1 = \beta_2; 2\delta_{11} = \delta_{12} = 2\delta_{22} \quad (6)$$

[46] The marginal impact of food stamp transfers is estimated to be as high as 17 times the normal cash marginal impact by J. Benus, J. Kmenta, and H. Shapiro in "The Dynamics of Household Budget Allocation to Food Expenditures," *Review of Economics and Statistics* 58 (May 1976): 129-138.

[47] Benjamin Senauer and Nathan Young, "The Impact of Food Stamps on Food Expenditures: Rejection of the Traditional Model," *American Journal of Agricultural Economics* 68 (February 1986): 37-43.

[48] The author is thankful to Professor Yair Mundlak for his comments and assistance in the derivation of this test.

or[49]

$$C = \alpha + \beta_1(Y) + \delta_1(Y^2) + e. \quad (7)$$

The test statistic is

$$F^* = [(R_m^2 - R_H^2)/(1 - R_M^2)][(N - 6)/3] \quad (8)$$

and the hypothesis can be rejected if $F^* > F^{0.05}_{3,N-6}$.

The test was conducted on two data sets—CFS 1978/79, made when rice quantity rationing was in effect, and CFS 1981/82, made when the food stamp system was in effect.

Results

The results, given in Tables 31-33, indicate that under the food stamp program, the source of income makes no difference in the marginal propensity to consume calories or to spend on food. Whether an additional rupee came from food stamps or other sources of income, the increments to calories and food expenditures were the same. In this connection, it is pertinent to point out that the patterns of food stamp use observed in the Kandy case study indicated that the recipients perceived little or no distinction between cash incomes and food stamps by the recipients (see Appendix 5). But the results from the period when rice was rationed show that the source of income does make a significant difference in the marginal propensity.

What causes subsidy incomes to have a greater and different marginal effect than other forms of income under price-subsidized quantity rationing and not under the food stamp scheme? Under the model specified earlier:

$$C = \alpha + \beta_1[(Y - S) + \lambda(S)] + \ldots + e; \quad (9)$$

$\lambda > 1$ and unique to S. The existence of λ in the case of food subsidies may have any of a number of causes. One could be the increase in food consumption when housewives control the subsidy income, which assumes that the housewife has the traditional role of mother and manager of the food resources in the household and that control by housewives minimizes leakages of income to non-food consumption. Another might be the moral obligation to use a larger proportion of subsidy income than normal income for food consumption because food subsidies are given to increase food consumption.[50] Also, there are difficulties in determining the real value of the subsidy.

Under the rice rationing scheme, the housewife usually kept custody of the ration coupons. The Kandy case study showed that this control over the subsidy did not diminish under the food stamp scheme (see Appendix 5).

If the argument about moral obligations is valid, then it should have been valid under both policies, particularly when control over subsidies did not shift. This leaves the difficulties in imputing the real value of price subsidies to the households as the primary reason for the difference in the results for the two subsidy schemes. The free rice given on ration each week, which formed the largest part of the subsidy received by low-income households during 1978/79, lacked a clear reference price because its quality was different from that of the rice available in the market. The rationed rice was often reprocessed. The processing costs increased the quality perceived by households. This makes the real economic value of rice rations difficult to calculate. In this study, the monetary value of the rice subsidy was cal-

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[49] Note that:

$$\beta_1 Y = \beta_1[(Y - S) + S], \text{ and}$$

$$\delta Y^2 = \delta_{11}(Y - S)^2 + \delta_{12}(Y - S)S + \delta_{22}(S)^2 - (\delta_{12}/2)(Y - S)^2 + \delta_{12}(Y - S)S + (\delta_{12}/2)(S)^2$$
$$= (\delta_{12}/2)[(Y - S)^2 + 2(Y - S)S + S^2] - (\delta_{12}/2)[(Y - S) + S]^2 = (\delta_{12}/2)Y^2.$$

[50] Senauer and Young, "The Impact of Food Stamps."

Table 31—Tests for differences in marginal propensities to consume calories out of subsidy income and all other disposable incomes, 1978/79 and 1981/82

	1978/79	1981/82
Under the model		
Marginal propensity to consume calories		
Subsidy income	27.8 calories	10.8 calories
Other expenditures	10.0 calories	7.5 calories
R^2	0.83	0.81
Number of households	2,770	3,065
Under the hypothesis (H_o)		
Marginal propensity to consume calories		
Total expenditures	10.8 calories	7.4 calories
R^2	0.79	0.81
Number of households	2,770	3,065
Test		
F^*	216	0
$F_3^{0.05}$, N-7	2.60	2.60
Result of test	Reject H_o	Cannot reject H_o

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The marginal propensities are calculated at the mean of the lower 60 percent of expenditure range. The model and H_o are defined in the text.

Table 32—Tests for differences in marginal propensities to spend on food out of subsidy income and all other disposable incomes, 1978/79 and 1981/82

	1978/79	1981/82
Under the model		
Marginal propensity to spend on food		
Subsidy income	0.78	0.72
Other expenditures	0.59	0.68
R^2	0.89	0.92
Number of households	2,770	3,065
Under the hypothesis (H_o)		
Marginal propensity to spend on food		
Total expenditures	0.60	0.73
R^2	0.88	0.92
Number of households	2,770	3,065
Test		
F^*	83.5	0
$F_3^{0.05}$, N-7	2.60	2.60
Result of test	Reject H_o	Cannot reject H_o

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).
Note: The marginal propensities are calculated at the mean of the lower 60 percent of expenditure range. The model and H_o are defined in the text.

Table 33—Estimates of the influence of different sources of income on total calories consumed, and on total food expenditures, 1978/79 and 1981/82

Explanatory Variable	Total Calories Consumed				Total Food Expenditures			
	CFS 1978/79		CFS 1981/82		CFS 1978/79		CFS 1981/82	
	Model	Hypothesis	Model	Hypothesis	Model	Hypothesis	Model	Hypothesis
Intercept	−38.5 (0.21)	−292.0 (1.6)	−286.177 (1.5)	−438.340 (2.6)	0.378 (0.06)	−4.05 (0.75)	−17.278 (1.9)	−30.478 (3.7)
Subsidy	21.63 (7.5)	...	8.309 (4.0)	...	0.771 (8.1)	...	0.533 (5.1)	...
Subsidy squared	0.0835 (10.72)	...	−0.0027 (1.1)	...	0.0001 (0.71)	...	−0.00001 (0.08)	...
Net expenditures	11.84 (24.2)	...	8.182 (27.0)	...	0.647 (39.6)	...	0.728 (49.0)	...
Net expenditures squared	−0.0005 (2.0)	...	−0 0005 (4.2)	...	−0.00004 (4.5)	...	−0.00003 (5.0)	...
Subsidy × net expenditures	−0.0151 (6.0)	...	0.0033 (2.4)	...	−0.00003 (0.4)	...	−0.00002 (3.3)	...
Total expenditures	...	12.62 (24.4)	...	8.340 (28.0)	...	0.667 (42.0)	...	0.736 (50.0)
Total expenditures squared	...	−0.0017 (5.9)	...	−0.0004 (3.5)	...	−0.00005 (6.0)	...	−0.00002 (4.0)
Household size	437.3 (17.4)	644.8 (25.6)	362.953 (13.3)	406.519 (18.4)	8.27 (9.9)	10.12 (13.0)	10.394 (8.0)	10.647 (10.0)
R^2	0.83	0.79	0.81	0.81	0.89	0.88	0.92	0.92
Number of households	2,770	2,770	3,065	3,065	2,770	2,770	3,065	3,065

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

Note: The t-ratios are given in parentheses.

culated by multiplying the amount of rice received under the rationing scheme by the unit price of rice purchased by the same households in the open market. However, the value of the food subsidies perceived by different households may have been quite different from the estimated values. The food stamp scheme does not give rise to these imputational problems. Given these problems with properly evaluating the food subsidy during the period when rice was rationed, the results suggesting differences in the impact of the forms of income appear to be ambiguous.

The Effect of Food Stamps on Calorie Consumption

To evaluate the nutritional effects of income transfers through food stamps, the expenditure elasticity of demand for calories and the change in calories given a 1 rupee change at the margin in per capita expenditures were derived from the following calorie consumption function estimated using data from CFS 1981/82 (see Table 34).

$$\begin{aligned} LPCCALS = {} & -0.649 + \underset{(25)}{2.4439}\ (LPCEXP) \\ & \quad (2) \\ & - \underset{(18)}{0.1665}\ (LPCEXP)^2 \\ & - \underset{(6)}{0.0451}\ (LHHSIZE); \qquad (10) \end{aligned}$$

$$R^2 = 0.72;$$

where

LPCCALS = natural log of per capita daily calorie consumption,

Table 34—Contribution of food stamps to the calorie consumption of recipients, by expenditure quintile, 1981/82

Per Capita Expenditure Quintile	Per Capita Expenditures	Calorie Consumption	Expenditure Elasticity for Calories	Marginal Calorie Consumption[a]	Food Stamp Value
	(Rs/month)	(calories/capita/day)		(calories/capita/day)	(Rs/month)
1	130	1,364	0.84	8.6	18.43
2	199	1,915	0.67	6.5	18.89
3	260	2,296	0.56	5.0	16.99
4	345	2,745	0.49	3.7	17.00
5	570	3,390	0.17	1.4	17.25

Per Capita Expenditure Quintile	Additional Calories from Food Stamps	Share of Calories from Food Stamps in Total Calories	Cost of 100 Calories from Food Stamps	Quintile's Share of Food Stamp Outlays	Calorie Adequacy Ratio[b]
	(calories/capita/day)	(percent)	(Rs)	(percent)	
1	159	11.6	0.38	38.4	0.62
2	122	6.4	0.52	28.4	0.8
3	85	3.7	0.66	17.8	1.04
4	63	2.3	0.90	11.1	1.24
5	24	0.7	2.39	4.1	1.54

Source: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

Note: The 1st quintile had the smallest expenditures; the 5th had the largest.

[a] This is the number of additional calories when Rs 1 is added to monthly per capita total expenditures.

[b] The calorie adequacy ratio is daily per capita calories divided by 2,200, where 2,200 is the national average per capita calorie requirement.

LPCEXP = natural log of per capita monthly total expenditure, and

LHHSIZE = natural log of household size.

(t-ratios are indicated within parentheses below the coefficients.) The estimates were restricted to those households receiving food stamps.

The expenditure elasticities of the bottom two quintiles indicate that they would increase calorie consumption by 7-8 percent if their disposable incomes increased by 10 percent. Targeting of income transfers to these groups would clearly increase the cost-effectiveness of the income transfer program. The data for marginal calories consumed reveal a similar story. Because of the combined effect of high expenditure elasticities and the low cost of the calories purchased by these low-income classes, the amount of additional calories consumed following a marginal (unit) increase in expenditures would be highest for these groups. The concept of marginal calories consumed can be used to estimate the net in ement to calorie consumption brought about by food stamp incomes.

It was observed earlier that the marginal calories obtained through food stamp incomes would be the same no matter what the source of income. The marginal calories supplied from the total value of food stamp incomes, has been derived on this basis (Table 34). Accordingly, the average per capita income received through food stamps could have increased consumption by approximately 160 calories per day per person, or about 12 percent of the total average individual calorie consumption of the lowest quintile. As expenditures rise, calorie consumption tends to increase, total calories bought with food stamps decline, and so does the share of calories from food stamps. For example, the contribution of calories from food stamps to total calories declines from 11.6 percent for the lowest quintile to less than 0.7 percent for the highest. The effect of food stamps on calorie consumption is higher among calorie-deficient groups that allocate larger shares of their total expenditures to food consumption and that purchase relatively lower-cost calories than other groups. The nature of these relationships, and the lack of discrimination between households through the expenditure range that received food stamps, have resulted in substantial leakages and, therefore, high costs of improving the nutrition of the needy.

Cost-Effectiveness of Food Stamp Subsidy

The implicit costs of providing 100 calories through food stamps to each expenditure class, shown in Table 34, clearly point to the increasing unit costs as household expenditures increase. These higher unit costs are brought about by the decreasing allocations for food out of additional income or, conversely, by increasing allocations out of food stamps to nonfood consumption and by a preference for higher-cost calorie sources, as household expenditures increase. The average (weighted) cost of supplying 100 calories through food stamps thus works out to 69 cents for the highest expenditure class, compared with only 38 cents to provide a similar amount of calories to the lowest expenditure class. This only crudely approximates the cost-ineffectiveness of the food stamp scheme, if its objective is to increase the calorie consumption of the needy.

Assuming that the people at greatest nutritional risk are concentrated in the bottom 20 percent of the population, the relative costs indicate a much lower degree of cost ineffectiveness. The Treasury spends 98 cents for each 100 calories provided through the food stamp scheme to the intended target group.[51] This is over 250 percent of the actual cost of 38 cents per 100 calories. The cost of the leakage is clearly large.

[51] The total food stamp outlay of Rs 1,660 billion amounts to Rs 4,547,945 per day. During 1981/82, recipients in the lowest quintile purchased 462,998,063 calories per day with their food stamp receipts.

Options for Modification

Table 35 shows the effect of food stamp allocations on average consumption of the poorest 20, 30, and 40 percent of the households. This information provides a basis for comparison of the potential effect of a reallocation of the total food stamp outlay that would minimize leakages. The food stamp outlay considered is Rs 1,700 million, the actual amount spent on the food stamp scheme after the number of recipients was frozen. Three options are considered for the reallocation simulation. Under Option A the total outlay would be allocated only among the poorest 20 percent. Option B would be to restrict food stamps to the poorest 30 percent only, and under Option C food stamps would be allocated to the poorest 40 percent. The simulations of the effects of the three scenarios are shown in Table 36.

Option A would have the greatest benefit for the households experiencing most serious calorie deficiencies. The new per capita food stamp allocation would be Rs 38.50, which is an additional Rs 20.00 to per capita incomes from the current value. Food stamps would account for 25.6 percent of the new income brought about by this change, whereas before the change food stamps contributed only 14 percent of total expenditures (Table 35). This might raise total consumption due to food stamps to 330 calories per capita per day, a net addition of 172 calories to consumption under the current food stamp scheme. This addition would increase total consumption from 1,368 calories to 1,540. Calories from food stamps would constitute 21.4 percent of the total. The calorie additions almost double the benefits from food stamps. Such consumption by the bottom 20 percent would be about 70 percent of the recommended daily average allowance of 2,200 calories.

As households are added under Options B and C, the per capita value of food stamp receipts and nutritional benefits decline. For example, if the entire bottom 30 percent is included, as in Option B, the contribution of calories from food stamps to total calories consumed by the lowest quintile falls to 16 percent, and calorie adequacy falls to 66 percent. Food stamp benefits for the poorest 20 percent are reduced further by Option C. As households in higher income groups are included, the cost of providing calories to the most needy will increase because the marginal propensity to consume calories out of additional incomes is lower for the higher-income households. The inverse relationship between income and the marginal propensity to consume food also means that removing current benefits will have less of an effect on food consumption by the richer households.

For example, consider the observed calorie consumption of 1,915 calories by stamp recipients in the second quintile of the expenditure distribution (Table 34). If these groups did not get food stamps, the reduction in calories would be 6 percent, compared with a reduction of 11 percent for the bottom quintile under similar conditions. Removal of food stamps from the second quintile during 1981/82 would have allowed them to consume 82 percent of the recommended allowance, compared with 87 percent with stamps. For the bottom quintile, the reduction would be from 62 percent to 55 percent of the recommended allowance. If current benefits are removed, the poor will face larger absolute reductions in calorie intake, as indicated by their higher marginal propensities to consume calories. Their relative reductions will also be large because their calorie intake is already low. It is evident from Table 34 that removal of food stamps from higher income groups would have only a minimal effect on their calorie consumption.

Targeting Implications: What Calorie Goals?

For income transfers to be meaningful, some specification of the expected nutritional goals may be warranted.

Typically, the allowances of calories recommended by the Food and Agriculture Organization of the United Nations and the World Health Organization (FAO/WHO) are used, after adjustments are made to cover local conditions, as the basis for deter-

Table 35—Effects of food stamp allocations on the poorest 20, 30, and 40 percent of households, 1981/82

Share of Households	Per Capita Expenditures	Food Stamps Per Capita		Calorie Consumption	Marginal Calories Consumption[a]	Calories from Food Stamps		Calorie Adequacy Ratio[b]
		Value	Share of Per Capita Expenditures			Number	Share of Total Calories	
	(Rs/month)		(percent)	(calories/capita/day)			(percent)	
Poorest 20 percent	130	18.43	14.0	1,368	8.60	159	11.6	0.62
Poorest 30 percent	146	18.48	12.6	1,496	8.03	148	9.8	0.68
Poorest 40 percent	162	18.64	11.5	1,616	7.47	139	8.6	0.73

Source: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

[a] Based on the calorie consumption relationships reported above.

[b] The calorie adequacy ratio is daily per capita calories divided by 2,200, where 2,200 is the national average per capita calorie requirement.

mining which groups are malnourished. Average per capita energy requirements based on the FAO/WHO recommendations are matched with apparent per capita intake of calories. Those consuming less than the average are considered to be malnourished.

Sukhatme has argued that it is unrealistic to believe that there is a universal, unvarying calorie standard, even after age, sex, and activity are taken into account.[52] To compare energy intake directly with a recommended allowance implies that intake

Table 36—Effects of reallocating the food stamp budget under different targeting options

	Poorest 20 Percent			Poorest 30 Percent			Poorest 40 Percent		
	A	B	C	A	B	C	A	B	C
Per capita expenditures (Rs/month)	150.00	138.50	131.50	...	154.50	147.50	...	...	163.40
Per capita availability of food stamps									
Value (Rs/month)	38.50	27.00	20.00	...	27.00	20.00	...	...	20.00
Share of per capita expenditures (percent)	25.60	19.50	15.20	...	17.50	13.50	...	...	12.20
Calories consumed (calories/capita/day)	1,540	1,441	1,381	...	1,564	1,508	...	...	1,626
Calories from food stamps									
Number (calories/capita/day)	331	232	172	...	216	160	...	...	149
Share of total calories (percent)	21.40	16.00	12.40	...	13.80	10.60	...	...	0.09
Net addition to calories consumed (calories/capita/day)	172	73	13	...	68	12	...	...	10
Calorie adequacy ratio[a]	0.70	0.66	0.63	...	0.71	0.68	...	...	0.74

Notes: Under Option A Rs 1,700 million is allocated only among the poorest 20 percent. Under Option B, Rs 1,700 million is allocated only among the poorest 30 percent. Under Option C, Rs 1,700 million is allocated only among the poorest 40 percent.

[a] The calorie adequacy ratio is daily per capita calories divided by 2,200, where 2,200 is the national average per capita daily requirement.

[52] P. V. Sukhatme, *Malnutrition and Poverty: Ninth Lal Bahadur Shastri Memorial Lecture* (New Delhi: Indian Agricultural Research Institute, 1977).

does not vary for an individual or between individuals. But there are mechanisms within an individual that regulate moderate variations in intake without changes in weight or activity, if the variations are not sustained for long. Measurement of these processes is complicated and may not be useful when large populations are considered. Although variations between individuals need to be recognized, one needs to be cautious when interpreting low calorie consumption among low-income households. The income-consumption relationship has to be distinguished from the variations between individuals due to requirements.

The use of a statistical approach has been suggested to determine a minimum intake as a cutoff point for determining the nutritionally deprived. One could consider this minimum to be two standard deviations below the mean of the average recommended intake. For example, given a population of healthy individuals, and assuming a normal distribution of intake among them, the intake of 95 percent of such individuals can be expected to be within the interval $\mu \pm 1.96\,\sigma$, where μ is the mean intake level, and σ is the standard deviation. Sukhatme has suggested this standard deviation could be 375 calories. If the mean adult equivalent calorie requirement is 3,000 calories, the minimum cutoff point based on these statistical criteria would be 2,250 calories for an adult male with moderate activity. For precise use of this methodology, a knowledge of the joint distribution of the calorie intake and requirements of individuals is essential.

In 1974, FAO introduced a new concept based on physiological considerations for deriving a minimum critical calorie intake. The new minimum became one and a half times the basal metabolic rate less 20 percent to account for variations between individuals in the basal metabolic rate. This minimum limit ranges between 1,486 and 1,631 calories in 58 developing countries.[53]

Sukhatme has also suggested that the coefficient of variability may be 12-15 percent of the average requirement and that individuals may adapt to intakes as low as 30 percent below that requirement or as high as 30 percent above it without serious harmful effects.[54] Translated to a recommended average calorie intake of 2,200, this allows a lower limit of 1,540 calories and an upper limit of 2,860 calories. The value of these lower bounds of basic energy requirements was demonstrated further through a study using a behavioral approach based on the revealed preferences of consumers. Monitoring of income-induced shifts from "quantity" to "quality" considerations in the choice of food in Indonesia, Peru, Brazil, and Sri Lanka has revealed that perceived basic energy adequacy appears to occur within a range of 1,500 to 1,900 calories.[55]

Precise energy requirements are yet to come from nutritional science. However, the above discussion provides an indication that food-related government transfers should try to ensure that average calorie consumption among low-income households is not less than a basic minimum of 1,500 calories. This is only 68 percent of the average recommended per capita allowance of 2,200 calories. A goal of 80 percent of the recommended allowance will have to ensure that per capita consumption averages 1,760 calories. Data from CFS 1981/82 showed that at least 150 more calories are required, on the average, for the lowest quintile to reach such a critical basic minimum. From the point of view of nutritional equity, higher goals are desirable but require more resources, the allocation of which will have to take into consideration both short- and long-run opportunity costs.

[53] Food and Agriculture Organization of the United Nations, *The Fourth World Food Survey* (Rome: FAO, 1977).
[54] Sukhatme, *Malnutrition and Poverty*.
[55] Neville Edirisinghe and Thomas T. Poleman, "Behavioral Thresholds as Indicators of Perceived Dietary Adequacy or Inadequacy," International Agricultural Economics Study 17, Cornell University, Ithaca, N.Y., July 1983.

9

THE NUTRITION OF CHILDREN AND INCOME TRANSFERS

Neither the current food stamp scheme nor the former price subsidy scheme has had any explicit objectives for child malnutrition. However, the operational aspects of both transfer schemes contain elements that appear to be related directly to the nutritional welfare of children. The option to have a food stamp scheme rather than a direct cash transfer scheme, inclusion of infant milk foods in the bundle of foods that food stamps can purchase, and the issue of the stamps with the highest value to children appear to be steps taken to ensure that children will benefit most from the food stamp scheme.[56] A feature of the earlier scheme was the price subsidy on infant milk foods. This subsidy was allowed to remain, at least partially, for a few years after the major price restructuring in the early 1980s.

As shown earlier, households do not view food stamps as different from any other form of income. Giving higher-valued food stamps to children thus would only increase the food stamp receipts of households qualified to receive food stamps and having large numbers of children. The effects on children would depend on the manner in which the household budget is distributed among members of the household. Low-income households allocate most of the additional income to food consumption. The effects of income transfers on child nutrition may be expected to be highest among these households, provided that food distribution within the household is equitable.

The proportions of children with Z-scores less than −2.0 in the case of height-for-age and weight-for-height can be used to reflect protein and calorie malnutrition among preschool children.[57] The Z-score, used for standardizing a distribution, is defined as follows:

$$Z = Mo - Me/SDe \qquad (11)$$

where

Mo = the observed measurement—for example, height or weight—of individuals in a given age or height group;

Me = the expected measurement—for example, median of the reference population; and

SDe = the standard deviation of the reference population distribution.

Notwithstanding some of the problems associated with the quantification of the problem of child malnutrition, the overall proportions of preschool children with Z-scores less than −2.0 provide reasonable evidence child nutrition in Sri Lanka is a matter to be concerned with.[58] More importantly, the evidence that lower-income households contain most malnourished children is sufficient justification for examining the role of income transfers in the nutritional welfare of children (Table 37).

[56] One apparent justification for the food stamp scheme was that more food for the family, and in particular for children, would be purchased than under a cash transfer program because the food stamps would be in the custody of the housewife (Sri Lanka, Department of the Food Commissioner, personal communication from the Food Commissioner, 1984).

[57] See World Health Organization, *Measuring Change in Nutritional Status* (Geneva: WHO, 1983).

[58] For a discussion of these issues and determinants of child nutrition in Sri Lanka, see Neville Edirisinghe, "Determinants of Nutritional Welfare Among Preschool-Aged Children in Sri Lanka," paper presented at the proceedings of the Seminar on Nutritional Status and Socioeconomic Survey, Food and Nutrition Policy Planning Division, Ministry of Plan Implementation, Sri Lanka, February 1984 (mimeographed).

Table 37—Share of preschool-aged children nutritionally at-risk, by expenditure quintile, 1980-82

Per Capita Expenditure Quintile	Share Having Height-for-Age Z-Scores Less Than −2.0	Share Having Weight-for-Height Z-Scores Less Than −2.0
	(percent)	
1	49.2	14.9
2	36.7	11.0
3	31.7	13.9
4	30.3	9.5
5	22.0	8.6
All	33.4	11.5

Source: Estimated using raw data from the Nutritional Status and Socioeconomic Survey 1980-1982 conducted by the Food and Nutrition Policy Planning Division of the Ministry of Plan Implementation, Sri Lanka.

Notes: The Z-score is

$$Z = (M_o - M_e)/SD_e,$$

where M_o is the observed height or weight of individuals in a given age or height group, M_e is the expected median height or weight of that group of the reference population, and SD_e is the standard deviation of the measurements for that group of the reference population.

Household resources affect the nutritional status of children through a number of channels, foremost of which is the supply of food for consumption by children. In general, one may expect a positive relationship between the amount of household resources and the amount of food children consume. But this relationship may be weakened by insufficient knowledge of the nature and amount of nutrients required by children for satisfactory growth. It may also be weakened by poor knowledge of how children's diseases affect their nutrition. This may be compounded by strong traditions and beliefs that restrict the types and quantities of food given to children.

The household survey from the Kandy district collected food consumption data from households pertaining to preschool children (see Appendix 5). The following discussion of the effects of income transfers is based on these data.[59]

Table 38 provides an indication of the relationship between the size of the shortfall of children's energy intake from the recommended allowances and their identification as nutritionally at risk. Preschool children with low calorie adequacy ratios—defined as the ratio of apparent energy intake to the energy allowance recommended for their age and sex—appear to have a higher risk of being malnourished than those who have higher calorie adequacy ratios. The table shows a negative relationship between the calorie adequacy ratio and the percentage with Z-scores less than −2.0 for all three indicators, height-for-age, weight-for-height, and weight-for-age.

Although food stamps are issued to individuals in a family, they are controlled either by the male head of the household or by the spouse. Food stamps are thus treated as additional income to the household as a whole. Whether incomes from food stamps, being directly related to food, have a larger effect on household nutrition than other forms of income was examined using Kandy survey data, but the test failed to provide statistical evidence of differences in impact.[60] This implies that any positive effect of the food stamp scheme on the nutritional welfare of children should operate through the effect of income on food consumption.

Data from the Kandy survey allow us to examine the effect of food stamp incomes on the calorie consumption of the members of stamp-receiving households divided into two groups: preschool children and all other members of the recipient households. Data on calorie consumption by preschool children and the entire household were collected separately. The number of calories

[59] A complete analysis of Kandy survey data related to child nutrition is found in Neville Edirisinghe and Nimal Hettiaratchi, "Child Nutrition and Its Determinants including Government Transfers and Intrafamilial Food Allocations: Evidence From the Kandy District, Sri Lanka," International Food Policy Research Institute, Washington, D.C., June 1986 (mimeographed).

[60] The same statistical model discussed in Chapter 8 was tested using data from the Kandy survey.

Table 38—Share of children nutritionally at-risk, by adequacy of calorie consumption, Kandy district, 1984

Ratio of Calorie Adequacy	Share of All Children	Share Having Height-for-Age Z-Scores Less Than −2.0	Share Having Weight-for-Height Z-Scores Less Than −2.0	Share Having Weight-for-Age Z-Scores Less Than −2.0
		(percent)		
Less than 60 percent	44.4	41.5	14.9	43.6
Between 60 and 80 percent	25.9	36.4	10.9	34.5
Greater than 80 percent	29.7	25.4	6.3	23.8

Source: Estimated from a survey of 480 households from the Kandy district conducted in 1984 by the International Food Policy Research Institute and the Food and Nutrition Policy Planning Division of the Ministry of Plan Implementation, Sri Lanka.

Notes: The Z-score is

$$Z = (M_o - M_e)/SD_e,$$

where M_o is the observed height or weight of individuals in a given age or height group, M_e is the expected median height or weight of that group of the reference population, and SD_e is the standard deviation of the measurements for that group of the reference population.

consumed by all other members was estimated by subtracting the calories consumed by preschool children from total household calories. These data were used to estimate calorie consumption functions for the two groups separately and to examine the effect of food stamps on the consumption of calories through their effect on income. (Children less than one year of age were excluded from this analysis due to the difficulties in accounting for nutrient intake from breastfeeding.)

The calorie consumption functions estimated for preschool children and all other members in households receiving food stamps are given in Table 39.[61] The t-ratios related to coefficients in the regression for preschool children show that the only significant variables explaining the calorie consumption of preschool children are per capita expenditures and the birth order of the child. The age variable can also be treated as being significant at a lower level of confidence.

Data on the effect of food stamp incomes on the calorie consumption of preschool children and all other members in households receiving stamps are presented in Table 40. Households in the lowest two quartiles of the expenditure distribution receive 11.8 percent and 10.3 percent, respectively, of their total disposable incomes from food and kerosene stamps. These estimates, however, may be biased upward because of the underestimation of total expenditures discussed earlier. This bias will not affect the relation between the expenditure elasticities of the two consumer groups within the households. The overall average contribution of food stamps to recipient household expenditures is 7 percent. In this context, it should be noted that the value of the kerosene stamp was increased by over 100 percent during 1984 while no change occurred in the food stamp entitlement.

A noteworthy characteristic of the expenditure elasticities estimated from calorie consumption functions is that the elasticities for the all other members category are higher than the elasticity estimates for preschool children. This difference in the calorie response to expenditure changes is

[61] In the regressions reported in Table 39, the natural log of the expenditure variable is used as an explanatory variable, giving a semi-log functional form for the consumption function. It allows the marginal propensities (MPC) and calorie elasticities with respect to expenditures to decrease with increasing expenditures and calorie consumption. These properties conform to expectations in consumption behavior and this functional form provided the best "fit" for the data in use.

Table 39—Estimates of the calorie-consumption function for preschool children and for other members of households receiving food stamps, Kandy district, 1984

Explanatory Variables	Preschool Children	Other Members
Intercept	617.26	−3,598.80
	(0.98)	(2.10)
Log of per capita expenditure	286.56	1,099.60
	(2.52)	(3.50)
Household size	...	−81.60
		(1.46)
Mother's education	−2.65	...
	(0.23)	
Age of child	3.98	...
	(1.40)	
Birth order of child	−38.96	...
	(1.94)	
Child dependency ratio[a]	−1.18	2.74
	(0.64)	(1.46)
R^2	0.20	0.17

Source: Estimated from a survey of 480 households from the Kandy district conducted in 1984 by the International Food Policy Research Institute and the Food and Nutrition Policy Planning Division of the Ministry of Plan Implementation, Sri Lanka.

Notes: The dependent variable is calories per child or other member per day. The t-ratios are given in parentheses.

[a] The child dependency ratio is the ratio of the number of children less than 14 years of age to the number of all other members of the household.

largest in the lowest expenditure quartile. A 10 percent increase in expenditures in this range may lead to a 9.3 percent increase in all other members' calorie consumption compared with a 4.4 percent increase for the preschool children. Beyond the first quartile, the gap in the calorie elasticities begins to narrow.

These elasticities, when related to the marginal increases in expenditures following receipt of food stamps, provide an indication of the contribution of food stamp incomes to the calorie consumption of the two groups. Food stamps received in the household appear to have increased the calorie consumption of preschool children by 5.4 percent and the calorie consumption of all others by 10.9 percent among households in the lowest quartile. As expenditures increase, the contribution of food stamps to the calorie consumption of the two groups tends to decrease.

Intrahousehold food distribution patterns were examined further after the calorie consumption of the two groups were standardized, using adult equivalent scales.[62] A few important consumption relationships emerge from this information, shown in Table 41. First is the resource-induced increases in the per adult equivalent calorie consumption of both preschool children and all other members. Second is that the difference in

[62] Intrafamilial food distribution issues related to Sri Lankan households are discussed in Neville Edirisinghe, "Intrafamily Food Distribution and Child Malnutrition: A Case Study from Sri Lanka," International Food Policy Research Institute, Washington, D.C., 1986 (mimeographed); and in Neville Edirisinghe and Nimal Hettiaratchi, "Child Nutrition and Its Determinants." For a discussion of the general issues related to this subject, see Beatrice L. Rogers, "The Internal Dynamics of Households: A Critical Factor in Development Policy," U.S. Department of Agriculture, Washington, D.C., 1983 (mimeographed); and E. G. Piwoz and Fernando E. Viteri, "Studying Health and Nutrition Behaviour by Examining Household Decisionmaking, Intra-household Resource Distribution, and the Role of Women in These Processes," *Food and Nutrition Bulletin* 7 (December 1985): 1-31.

Table 40—Characteristics of households receiving food stamps and the effects of food stamps on the calorie consumption of preschool children and other households members, by expenditure quartile, Kandy district, 1984

Per Capita Expenditure Quartile	Total Expenditures	Household Size	Food Stamp Value		Food Stamps as Share of Total Expenditures
			Total	Per Capita	
	(Rs/month)		(Rs/month)		(percent)
1	900	7.17	107.43	14.24	11.8
2	934	6.20	96.56	15.61	10.3
3	1,396	6.30	88.65	14.00	6.4
4	2,169	6.69	92.08	13.76	4.2
All	1,343	6.56	96.18	14.66	7.2

Per Capita Expenditure Quartile	Calorie Consumption		Expenditure Elasticities for Calories		Calories from Food Stamps	
	Preschool Children	Other Household Members	Preschool Children	Other Household Members	Preschool Children	Other Household Members
	(calories/capita/day)				(percent)	
1	623	1,176	0.45	0.93	5.4	10.91
2	622	2,129	0.45	0.51	4.7	5.25
3	838	2,065	0.34	0.53	2.2	3.39
4	898	2,243	0.31	0.48	1.3	2.01
All	744	1,913	0.38	0.57	2.7	4.10

Source: Estimated from a survey of 480 households from the Kandy district conducted in 1984 by the International Food Policy Research Institute and the Food and Nutrition Policy Planning Division of the Ministry of Plan Implementation, Sri Lanka.

the calorie adequacy ratios of preschool children and all other members are large throughout the expenditure range. Third is that the rate of change in the calorie adequacy ratios in the two categories changes when moving to a higher level of resource availability.

In this instance, the calorie adequacy ratio of all other members improves by 28.6 percent when moving from the lowest expenditure quintile to the next. Between the same expenditure categories, the preschool children's calorie adequacy ratio rises only 6.4 percent. The increase for the former is nearly 450 percent of the latter.

It can be seen from Table 41 that all other members in the second quintile consumed around 83 percent of the recommended allowance of calories.[63] And the highest relative increase in the calorie adequacy ratio of preschool children occurs between expenditure quintiles 2 and 3. In other words, only after all other members achieve around 80 percent of calorie adequacy does the calorie consumption of preschool children increase significantly. This characteristic allows one to make an inference that when resources are in short supply, allocations within the family tend to favor the more productive members of the household. This behavior, perhaps, may be a part of a survival strategy rather than a reflection of a lack of knowledge of the nutritional requirements of the less productive member.

These results indicate that government transfers may affect groups or members of a household differently, although the overall

[63] This increase was found to be significant at the 10 percent level of probability.

Table 41—Mean calorie adequacy ratios of preschool children and other members in households receiving food stamps, by expenditure quintile, Kandy district, 1984

Per Capita Expenditure Quintile	Per Capita Expenditure	Preschool Children			Other Members		
		Adult Equivalent Calorie Consumption	Calorie Adequacy Ratio	Increase from Preceding Expenditure Quintile	Adult Equivalent Calorie Consumption	Calorie Adequacy Ratio	Increase from Preceding Expenditure Quintile
	(Rs/month)	(calories/capita/day)		(percent)	(calories/capita/day)		(percent)
1	122	1,468	53.38	. . .	1,779	64.69	. . .
2	168	1,562	56.80	6.4	2,288	83.20	28.6
3	222	1,910	69.45	22.2	2,373	86.29	3.7
4	304	1,933	70.29	1.2	2,704	98.32	13.9
5	878	2,280	82.90	17.9	3,649	132.69	34.9
All	337	1,830	66.50	. . .	2,555	92.90	. . .

Source: Estimated from a survey of 480 households from the Kandy district conducted in 1984 by the International Food Policy Research Institute and the Food and Nutrition Policy Planning Division of the Ministry of Plan Implementation, Sri Lanka.

impact of food-related income transfers may not be any different from any other form of income. However, the results also suggest that apparent "discrimination" may not necessarily be "irrational." Income transfers may have a greater effect on preschool children if the transfers are large enough to ensure that a reasonable number of calories, such as 80 percent of the recommended allowance, is consumed by the more productive members of the household.

10

POLICY IMPLICATIONS

This joint F&NPPD/IFPRI study was undertaken with the support of USAID to help the government of Sri Lanka assess the performance of the food stamp scheme and to explore whether modification of the scheme might raise its cost-effectiveness. This task was performed taking into consideration the overall economic policy reforms, of which changes in the subsidy scheme were an integral part.

The findings of this study point to two basic facts—that there has been a deterioration in the nutritional welfare of households in the lowest segment of the income distribution, and that a well-intended income transfer scheme has not been able to mitigate the effect of inflation on these households.

Nutritional Goals

Any income transfer program will require specific objectives. Enhancement of the general welfare of weaker sections may be a goal to be achieved through income transfers, but measurement of its success will face numerous problems. A nutritional goal, such as ensuring consumption of a given amount of energy, would avoid such problems. It may seem ideal to have a calorie goal to ensure that everyone gets the recommended energy allowances without a shortfall. But the resources required to achieve such a goal may be prohibitive. A calorie goal therefore has to consider the amount of resources available for diversion to consumption and at the same time avoid being self-defeating by focusing on a calorie standard lower than could be achieved. There is some evidence that the minimum critical average daily per capita requirement may be in the range of 1,500 to 1,800 calories.[64] The higher amount is preferable to the lower one because it would minimize the probability of counting out anyone who is truly at nutritional risk. The choice between the two calorie goals may be determined by the availability of resources. The crucial implication is that a reasonable calorie goal should be able to ensure at least 1,500 calories per capita per day to the recipients.

A simulation conducted using data from the 1981/82 survey showed that the calorie consumption of the bottom 20 percent could have been raised from the observed 1,364 calories to 1,540 calories per capita per day if the initial allocation of Rs 1.7 billion for food stamps was confined to this expenditure class. This could have resulted in these households' receiving Rs 38.50 per month in food stamps instead of the Rs 18.00 per month they usually received. Benefits given to additional households from higher expenditure classes obviously reduced the food stamp allocation for the lowest 20 percent, reducing the calorie contribution of food stamps. Based on the calorie consumption relationships observed during 1981/82, it was also seen that a removal of food stamp eligibility from the expenditure classes above the bottom 20 percent would not have seriously affected the consumption of the higher-income classes presently receiving food stamps.

The budgetary requirement for income transfers would thus depend on the calorie goals to be achieved through them and the degree to which targeting can be effective. For example, in 1981/82 a calorie goal of

[64] However, with the present state of knowledge on the nutritional requirements of individuals or households, any minimum calorie goal is to a degree arbitrary.

a minimum of 1,500 daily per capita calories would require transfer of about Rs 1.7 billion to the bottom 20 percent of households. A higher calorie goal, such as 2,200 calories—the recommended allowance of an average Sri Lankan—would have required that at least Rs 6.3 billion be transferred to households in the lower half of the income distribution. Such income transfers would have raised per capita monthly expenditures to about Rs 240, the level of expenditures at which households consumed about 2,200 calories per capita per day during 1981/82.

Criteria for Targeting

Whichever calorie goal is adopted, its realization would depend heavily on the efficiency with which income transfers are targeted. There is no unique criterion or formula that can be adopted to identify the intended beneficiaries.[65] There may be many options and a choice would depend on numerous considerations, such as the goals of the income transfers, the availability of resources, political feasibility, and economic and operational efficiency. The government of Sri Lanka has a clear policy of eliminating consumer food price subsidies and the rice rationing scheme.[66] This is an integral part of an overall policy of minimizing government intervention in the marketplace. The income transfer program has to be modified within this framework. One option is to relate eligibility to observable manifestations of malnutrition. Malnutrition manifests itself in individuals in biology and behavior. For example, it can reduce growth of height and body mass, hinder mental development, and limit activity. The outcome variables of malnutrition that can be easily identified and measured are anthropometric and child-related. The most commonly used anthropometric indicators are the heights and weights of children, which are compared against indicators from a healthy reference population to determine the degree to which protein-calorie malnutrition may have hampered growth. Households with malnourished children, as determined by given anthropometric or other medically determined criteria, may be a target population for income transfers.[67] Although targeting based on anthropometrically determined child malnutrition appears to be advantageous operationally, it may contain a large number of disadvantages. The main disadvantage is that it is child-specific and requires screening of all children to identify the ones who are nutritionally at risk. This would leave out all other households without preschool children, even though some may be nutritionally at risk.

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[65] Different countries have adopted different targeting criteria. Their success or failure largely depends on conditions and circumstances in that country. A useful summary of these experiences can be found in Beatrice L. Rogers, "Design and Implementation Considerations for Consumer Food Price Subsidies," paper presented at the Conference on Consumer-Oriented Food Subsidies sponsored by the International Food Policy Research Institute, Chiang Mai, Thailand, November 13-15, 1984 (mimeographed); and in Per Pinstrup-Andersen and Harold Alderman, "The Effectiveness of Consumer Food Subsidies in Reaching Rationing and Income Transfer Goals," paper presented at the Conference on Consumer-Oriented Food Subsidies, Chiang Mai, Thailand November 13-15, 1984 (mimeographed).

[66] The issue of limited quantities of staples at subsidized prices is existent in the neighboring countries such as India, Pakistan, and Bangladesh; Egypt, which has a comprehensive food price subsidy program, also has rationing of some foods at subsidized prices. See Shubh Kumar, *Impact of Subsidized Rice on Food Consumption and Nutrition in Kerala*, Research Report 5 (Washington, D.C.: International Food Policy Research Institute, 1979); Beatrice L. Rogers and F. J. Levinson, "Subsidized Food Consumption in Low-Income Countries: The Pakistan Experience," International Nutrition Planning Program Discussion Paper 13, Massachusetts Institute of Technology, Cambridge, Mass., 1979); Raisuddin Ahmed, *Foodgrain Supply, Distribution, and Consumption Policies Within a Dual Pricing Mechanism: A Case Study of Bangladesh*, Research Report 8 (Washington, D.C.: International Food Policy Research Institute, 1979); and Harold Alderman, Joachim von Braun, and Sakr Ahmed Sakr, *Egypt's Food Subsidy and Rationing System: A Description*, Research Report 34 (Washington, D.C.: International Food Policy Research Institute, 1982).

[67] The food stamp scheme that operated in Colombia for a short time used child malnutrition as a component in its targeting strategy. It was restricted to certain regions. The program was terminated without a comprehensive evaluation. See Mario Ochoa, "The Colombian Food System: Design, Results, Nutritional Impact, and Political Constraints," International Food Policy Research Institute, Washington, D.C., 1984 (mimeographed).

Child malnutrition may not be related to income, either. This study, for example, found children that anthropometric indicators showed were malnourished throughout the income range. This implies that a decision on an income cutoff will be necessary if a limited allocation is to be distributed efficiently. Additional problems may arise out of the availability of many anthropometric indicators and the controversies that surround the choice of proper standards for comparing them. Targeting based on child malnutrition will require technical expertise and the involvement of personnel who are already engaged in child-related intervention programs. Integration of these personnel and child-specific programs into a potentially broad-based income-transfer program may reduce the efficiency of both types of programs. Even if some of these problems are resolved, a separate scheme will be required to address the problems of malnutrition among households that do not have children. If the objective of income transfers is not limited to reduction or elimination of child malnutrition, other options for targeting need to be considered.

Another option is to use the amount of easily assessable resources, such as landholdings, as a basis for targeting. In predominantly agricultural societies where input and output markets operate only minimally, amount of land or livestock may be a useful indicator of the nutritional welfare of households. It is unlikely that the situation in Sri Lanka would lend itself to the use of such indicators. Apparent malnutrition, whether seen through child-related indicators or through observed food consumption relative to minimum nutrient requirements, does not seem to be confined to certain geographical areas or to agricultural regions.[68] In addition, tangible assets, such as landholdings, may not generate income. Above all, in the rural sector, most of the nutritional problem is faced by the landless. Total wage earnings would be the more relevant criterion for them.

Income transfers could also be channeled through a scheme that provides self-targeting foods. These foods have negative income elasticities of demand. These are usually the less preferred starchy staples, such as yams, manioc, maize, and coarse grains. The higher the income, the lower their consumption. Lower-income households will benefit more by the provision of such foods than higher-income households, by their own choice.[69] This study observed that even in the rural sector in Sri Lanka, these foods are minimally consumed. To achieve nutritional goals through these foods will require significant changes in the preferences of households. Three decades ago, wheat flour would have been a suitable candidate for this option, but wheat is no longer considered an inferior food by most of the population. Even if wheat or any of its derivatives—which have to be totally imported—qualify, one has to consider the ef-

[68] This fact rules out the possibility of regional or zonal targeting of transfers. Targeting of food coupons to households in a few areas where poverty and malnutrition were relatively high was conducted on an experimental basis in a recent pilot project in the Philippines. Research on this pilot project has shown that the program has favorable effects on nutrition. However, it is yet to be seen how such targeting is to be operationalized to cover all other "poor" regions of the country. See Marito Garcia and Per Pinstrup-Andersen, "The Pilot Price Subsidy Scheme in the Philippines: Impact on Poverty, Food Consumption, and Nutritional Status," International Food Policy Research Institute, Washington, D.C., June 1986 (mimeographed).

[69] Gray has demonstrated how different income classes would gain or lose if the existing wheat subsidy in Brazil is changed to other commodities: if changed to cassava, for instance, the poor would gain and the rich might lose. See Cheryl Williamson Gray, *Food Consumption Parameters for Brazil and Their Application to Food Policy*, Research Report 32 (Washington, D.C.: International Food Policy Research Institute, 1982). In Egypt, the subsidy on wheat flour benefits the rural poor more than the urban poor. See Harold Alderman and Joachim von Braun, "Welfare and Distributional Impact of the Egyptian Food Ration and Subsidy System," International Food Policy Research Institute, Washington, D.C., September 1983. In Bangladesh, sorghum rather than rice and wheat would benefit the poor more. See Rezaul Karim, Manjur Majid, and F. James Levinson, "The Bangladesh Sorghum Experiment," *Food Policy* 5 (February 1984): 61-63. Kahn has observed in the study from Rawalpindi City that the type of subsidized wheat has been somewhat self-targeting since the rich preferred and could afford better quality wheat in the open market.

fects a wheat distribution scheme may have on domestic agricultural production and the food preferences of different groups.

Another option for targeting is to have the community play an important role in determining the recipients of income transfers.[70] Briefly, a given community would be allowed to know who the claimants of the benefits are so that information on the economic status of the claimants known to other members of the community may be used to screen applicants. Such a strategy implies a high degree of awareness by a given community of socioeconomic status of the households belonging to the community and willingness by at least some to help in the screening. It also implies that households would be sensitive to the social stigma attached to a communally detected "fraudulent" practice. But the universal subsidy scheme in which the rich and poor participated for a long time may have diminished the social stigma attached to receiving public assistance. It will, therefore, require a large effort to teach the public that the income transfers are only meant for the really poor.

A prerequisite for success of this option is extensive participation by households in community and social affairs. Extensive participation by the people in the democratic process of representative government, the existence of a multiparty political system, relatively high literacy rates, and the existence of a competent public administration structure in Sri Lanka are conducive to successful operation of this strategy. This option may prove disadvantageous to those low-income households that are unwilling to participate in a program that exposes each claim to the community at large. Supplementary schemes, such as those based on observed child malnutrition, may help avoid the elimination of households that truly need assistance. For example, the health and medical authorities could be encouraged to recommend assistance to any deserving families not included in the relief program.

Likewise, the presently available information for each key region on household calorie deficiencies and child malnutrition could be compared with the shares of income transfers allocated to the regions under the new scheme. Specific information on the infant and maternal mortality rates in each region could also be used to compare apparent demand for and actual supply of income transfers. The government institution responsible for the actual operation of the income transfer scheme will require the assistance of all other government and nongovernment institutions working in health and nutrition. In this regard, a central agency such as the Food and Nutrition Policy Planning Division could coordinate the external information required to operate the income transfer program efficiently.

Modification Implications: Eligible Incomes

A reorganization of the present income transfer scheme to increase its efficiency will first require a decision on a new minimum household income for eligibility. The analysis in this study was based on total expenditures or disposable incomes rather than incomes per se. One strategy may be to use a new eligibility criterion based on disposable incomes and subsequently adjust it to reflect the usual underreporting of incomes to arrive at the required household income.

For example, if a decision to limit the food stamps to the bottom 20 percent is made, the household disposable income that would ensure calorie consumption similar to that observed in 1978/79 (around 1,500 calories) would be approximately Rs 850. This assumes a family of six and the consumption patterns observed under the new incomes and price structure in 1981/82. Considering that reported incomes in household surveys show that at least 10-15 percent of the underreporting of disposable

[70] Present plans to change the food stamps to "poor relief" is based on this option.

incomes (total expenditures) is at the lower end of the income range, one may expect the reported income of the bottom 20 percent to be around Rs 750. Accordingly, the income cutoff point for eligibility could be placed at Rs 750. However, it should be noted that this is based on the 1981/82 income-price structure and consumption relationships, and that the expected calorie consumption is about 1,500 calories—approximately 70 percent of the recommended allowance.

Modification Implications: Future Inflation

Finally, a modification of the present food stamp scheme has to consider the impact that future inflation may have on the real value of income transfers. It was observed that the real value of food stamps had almost halved between 1979 and 1982 in the absence of a mechanism to adjust for inflation. Effective targeting would be a prerequisite for indexing. Periodic examination of the income transfer program may be required for elimination of any unqualified recipients and to change the monetary value of the transfers to meet any erosion of their real value. Under the former rice rationing scheme, the transfer was automatically indexed when rationed quantities were not changed in response to price increases. This partly explains the popularity of the rice ration scheme. But a return to a rice rationing program as a self-indexed income transfer program appears to be incompatible with the current set of ongoing economic policies, which has internal and external trade liberalization as a mainstay. Public distribution of foodgrains usually requires a comprehensive network affecting producers, consumers, transportation, milling and processing, storage, wholesale and retail trading, and other aspects of the food economy.[71] Before reversing policies, the economic and social costs of the overall involvement should, ideally, be evaluated against alternative options that can achieve similar benefits.[72] The additional monetary and social costs of operating a rice rationing scheme as a self-indexed income transfer program may be more than the additional costs involved in having a direct transfer program indexed to open-market changes in rice prices. Indexation of the income transfers based on rice prices may or may not maintain the original value of the transfer. This study found no difference between food-related income transfers and any other form of income in their effects on food expenditures or consumption. Thus an overall cost-of-living index is the more relevant reference for making adjustments to maintain the real value. Indexation based on changes in rice prices has operational advantages because of ease with which rice price indexes can be computed. Indexing may require additional transfer allocations, but successful implementation of economic development programs and efficient supervision of the income transfer program would ensure that the share of the transfer program in public expenditures will not change significantly.

[71] For a discussion of the operational and economic implications of public food distribution in Sri Lanka, see Edirisinghe and Poleman, "Implications of Government Intervention"; and Gavan and Chandrasekera, *The Impact of Public Foodgrain Distribution.* For a discussion of the negative effects on production, see D. R. Snodgrass, *Sri Lanka: An Export Economy or Transition* (Homewood, Ill.: Richard D. Irwin, Inc., 1966).

[72] Such an evaluation would also include an examination of the positive effects of market-determined prices on the growth of agricultural output. That prices may have played a significant role in increased paddy production is evidenced in a recent study on the supply response of paddy farmers. See Thorbecke and Svejnar, "Effects of Macroeconomic Policies." At the same time, high prices for the main staple may harm even farmers who are net purchasers if additional incomes to their households from better wages and more employment opportunities are insufficient to compensate for real income losses due to price increases. See Sahn, "The Effect of Price and Income Changes." It appears that suitable income transfers to such farmers would help increase their effective demand while maintaining price incentives for producers.

Child Nutrition and the Food Stamp Scheme

The findings about intrahousehold food allocation behavior have implications for the implicit objective of enhancing child nutrition through the food stamp scheme. Most apparent child malnutrition is found in low-income households, but older members take priority when incomes are transformed into food consumption. This apparent discrimination against younger members would diminish, however, if income transfers are large enough to meet at least 80 percent of the energy requirements of the more productive members of the household. In this regard, the earlier discussion of the minimum calorie goals finds further strength from intrahousehold food distribution patterns. If protein-energy malnutrition among preschool children is to be addressed through the food stamp scheme, the modifications discussed earlier would throw light on the implications for such an objective. The fundamental implication is that a sufficiently large income transfer to the households in the lowest quintile, in terms of the present fiscal allocation for the food subsidy, would require that the total allocation be transferred to the bottom quintile. Even if this could be accomplished, calorie adequacy, related to per capita consumption, may have been only about 70 percent, and that with 1981/82 prices. Thus limited income transfers, such as effected through present food stamps, may not adequately address the problem of child malnutrition. Such a program clearly needs to be complemented by other programs aimed directly at children.

Sri Lanka has had a large number of programs sponsored both by the government and nongovernment organizations specifically to address child welfare.[73] These include health services, both preventive and curative, and supplementary feeding programs using prepared weaning foods, such as Triposha. Although the size of the effects of each program may not be discernible, it is reasonable to conclude that the cumulative effect of all programs may have significantly contributed to child welfare as reflected in the infant mortality rates, which are lower than in many other countries. There appears to be no evidence yet to support an elimination of these child-specific intervention programs or even to reduce the intensity of current programs. This observation, of course, does not preclude any modifications to current programs to make them more cost-effective.

[73] For a discussion of current child specific intervention programs, see Sri Lanka, Ministry of Plan Implementation, Food and Nutrition Policy Planning Division, "Nutritional Status, Its Determinants and Intervention Programs," Ministry of Plan Implementation, Colombo, 1983.

APPENDIX 1: SUPPLEMENTARY TABLES

Table 42—Number of members in households eligible to receive food stamps

Annual Household Income Per Year	Number of Members in the Household								
	5	6	7	8	9	10	11	12	13
(Rs)	(number eligible for food stamps)								
3,600 or less	Up to 5	6	7	8	9	10	11	12	13
3,601–4,320	None	1	2	3	4	5	6	7	8
4,321–5,040	None	None	1	2	3	4	5	6	7
5,041–5,760	None	None	None	1	2	3	4	5	6
5,761–6,480	None	None	None	None	1	2	3	4	5
6,481–7,200	None	None	None	None	None	1	2	3	4
7,201–7,920	None	None	None	None	None	None	1	2	3
7,921–8,640	None	None	None	None	None	None	None	1	2
8,641–9,000	None	None	None	None	None	None	None	None	1

Source: Sri Lanka Ministry of Plan Implementation, *Evaluation Report on the Food Stamp Scheme* (Colombo: Ministry of Plan Implementation, 1982), p. 4.

Table 43—Calorie consumption per adult equivalent, by expenditure decile and sector, 1978/79 and 1981/82

Per Capita Expenditure Decile	1978/79				1981/82			
	Urban	Rural	Estate	All	Urban	Rural	Estate	All
	(calories/adult equivalent unit/day)							
1	1,656	1,749	1,712	1,730	1,521	1,570	1,617	1,566
2	2,089	2,142	2,432	2,147	1,771	2,062	2,186	2,031
3	2,213	2,366	2,764	2,376	1,982	2,326	2,584	2,305
4	2,340	2,566	2,963	2,575	2,316	2,574	2,836	2,562
5	2,468	2,761	3,296	2,783	2,486	2,778	3,047	2,768
6	2,586	2,978	3,515	2,983	2,624	3,009	3,377	2,983
7	2,797	3,070	3,822	3,118	2,793	3,202	2,748	3,175
8	3,037	3,369	3,908	3,353	3,092	3,520	4,084	3,494
9	3,317	3,663	4,756	3,690	3,261	3,866	4,546	3,760
10	3,589	3,797	4,600	3,762	2,550	4,153	4,394	3,905
Average	2,755	2,784	3,546	2,852	2,796	2,823	3,344	2,855

Sources: Based on data from Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape); and Central Bank of Ceylon, "Consumer Finances and Socioeconomic Survey 1981/82," Central Bank of Ceylon, Colombo, n.d. (computer tape).

APPENDIX 2: DATA SOURCES

Most of the analysis in this study required comparing data from two time periods. This was greatly facilitated by the availability of two comprehensive household surveys conducted by the Central Bank of Ceylon—the two Consumer Finances and Socioeconomic Surveys of 1978/79 and 1981/82 (CFS 1978/79 and CFS 1981/82).[74] The comparability of the two surveys with regard to the conducting agency, survey design, sampling procedures and definitions, questionnaires and time coverage, provide a rare basis for a high degree of confidence in the variables from these surveys used in this study.[75]

The two surveys were planned and conducted by the Department of Statistics of the Central Bank with a large number of staff members planning, supervising, and working in the field for both. The sample design of the two surveys differed only minimally, without endangering comparability; concepts and definitions were also similar.[76] Both used almost identical questionnaires and data-gathering methodology to collect information on demographic characteristics, housing particulars, employment, food and nonfood expenditures, household incomes, savings, investments, and indebtedness. Each survey was planned to cover a sample of 8,000 households, with 2,000 households interviewed in each of the four survey rounds. The response rates were 99 percent for CFS 1981/82 and 95 percent for CFS 1978/79.

The four rounds were intended to capture seasonality effects. CFS 1978/79 was conducted from October 1978 to September 1979, mostly before the removal of price subsidies, most of which occurred during late 1979 and in 1980. The new food stamp scheme, however, was introduced in September 1979. The survey may reflect some effects of economic liberalization on income and commodity flows. The four rounds of CFS 1981/82 were begun in October 1981 and completed in September 1982. By the time this survey was carried out, consumption and expenditure patterns had probably adjusted to the initial shocks from the removal of price subsidies and to new income flows from economic policy changes.[77]

Most of this study used income and expenditure variables from the two surveys. When these data were obtained from the Central Bank, they had already been examined and cleaned for use in the World Bank-Central Bank of Ceylon Project on Evolution of Living Standards in Sri Lanka.[78] Data on income and expenditure had been collected for spending units, defined to consist of one or more persons who are members of the same household and share a major part of income and expenditure. These data were aggregated at the household level for this study. The aggregated data were scrutinized further and some apparent outliers were removed when household calorie consumption was estimated. The estimation procedures are described later in this appendix.

That a high degree of faith can be placed in the data of this survey is demonstrated by the close correspondence between na-

[74] The author is indebted to the Central Bank of Ceylon for providing data requirements for this study.

[75] For a critical evaluation of these surveys, see S. Anand and C. Harris, "Living Standards in Sri Lanka, 1973-1981/82: An Analysis of Consumer Finance Survey Data," report prepared for the World Bank-Central Bank of Ceylon project on the Evolution of Living Standards in Sri Lanka, Oxford University, Oxford, U.K., April 1985 (mimeographed).

[76] Central Bank of Ceylon, *Report on the Consumer Finances and Socioeconomic Survey 1978/79;* and Central Bank of Ceylon, *Report on Consumer Finances and Socioeconomic Survey 1981/82.*

[77] The Central Bank's New Series of National Accounts uses 1982 as the base year. The major consideration for the choice of 1982 as the base year was that the structural changes in the economy flowing from the radical changes in economic and financial policies adopted in 1977 had stabilized by 1982 (Central Bank of Ceylon, *Annual Report 1982* [Colombo: Central Bank of Ceylon]).

[78] Anand and Harris, "Living Standards in Sri Lanka."

tional estimates of certain variables and the figures given in national accounts. The national accounts published for the calendar year were made comparable to survey accounts by taking weighted averages. The weights were 0.25 for the 1978 and 1981 accounts and 0.75 for the 1979 and 1982 accounts. Similar weights were used for population figures. The comparison showed that the weighted average of total food and kerosene stamps issued during 1981 and 1982 was Rs 1,660 million. The estimate from CFS 1981/82 was Rs 1,640 million. The estimated total food subsidy on rice, wheat, and sugar from CFS 1978/79 was 97 percent of the weighted average in the national accounts. The estimated daily per capita calorie availability from CFS 1978/79 was 2,283 calories and from CFS 1981/82, 2,271 calories. The National Food Balance Sheets show availability to have been 2,324 calories during 1978/79 and 2,191 calories during 1981/82. Estimates from the CFS surveys and the national accounts of annual per capita food and total consumption expenditures show the CFS survey estimates of food consumption expenditure to be 95.3 and 89.4 percent of the national accounts for 1981/82 and 1978/79 (see Table 44). CFS survey estimates of total private consumption were 78.2 and 73.2 percent of the national accounts figures for 1978/79 and 1981/82.

Table 44 points to an apparent larger underestimation of nonfood expenditures than of food expenditures in both CFS survey data. The 1981/82 data seem to have a larger underestimation than the 1978/79 data. These data are underestimated, however, only if it is assumed that the annual national accounts estimates and the weighted averages used in Table 44 are accurate.[79] A discussion on the estimation procedures adopted in deriving national accounts estimates is beyond the scope of this paper. As for the weighting procedures, Anand and Harris discuss the possible bias in estimates when weighting has to be done simply in the absence of quarterly estimates.[80] However, the observation that total expenditures may have been more underestimated during 1981/82 than during 1978/79 can have implications when welfare comparisons are made. For example, it may lead to an underestimation of the difference in real consumption between 1981/82 and 1978/79. In another vein, the difference in food shares between 1981/82 and 1978/79 may be overestimated. Such an overestimate may be made larger if food expenditures are "better" represented in 1981/82 than in 1978/79.

Table 44—Estimates from Consumer Finance Surveys and National Accounts of annual per capita food and total private consumption expenditures, 1978/79 and 1981/82

	1978/79			1981/82		
	Consumer Finance Survey	National Accounts	Ratio	Consumer Finance Survey	National Accounts	Ratio
	(Rs/capita/year)					
Total private consumption expenditures	2,079	2,660	78.2	3,734	5,099	73.2
Food expenditures	1,133	1,268	89.4	2,167	2,273	95.3

Source: S. Anand and C. Harris, "Living Standards in Sri Lanka, 1973-1981/82: An Analysis of Consumer Finance Survey Data," report prepared for the World Bank Central Bank of Ceylon project on the Evaluation of Living Standards in Sri Lanka, Oxford University, April 1985 (mimeographed), p. 75.

[79] The weighting procedure adopted to make annual data comparable with the CFS survey periods is the same as the procedure described earlier in this appendix.

[80] Anand and Harris, "Living Standards in Sri Lanka," p. 73.

In this context, a more fundamental aspect needs consideration. The two CFS surveys were conducted after trade liberalization policies were adopted; the first almost immediately after the new policies were begun, and the second about 3 years after they became effective. Considering that trade liberalization came after three decades of controls and scarcities, and that in the post-liberalization period the economy grew at a rate of 5-6 percent per year, consumer expenditures could be expected to be heavy, particularly on consumer durables and semidurables. Such expenditures could be expected among the upper-income households first. Durables and semidurables, almost by definition, are not replaced in the short run. This gives rise to the possibility that the nonfood expenditures reported by the upper-income households reflect the heightened demand for durables and semidurables in the period just before the 1981/82 survey reference period. Caution is thus required when interpreting comparisons of real consumption in general and among the upper-income classes in particular.

APPENDIX 3: ESTIMATION OF FOOD STAMP RECEIPTS BY HOUSEHOLDS

The estimates of the incidence of food stamp recipients and receipts had to be derived using an indirect procedure because the food stamp data were not recorded separately from other government transfers in the CFS 1981/82 survey. However, government transfers were recorded as a separate source of household income. The usual channels through which government transfers can be added to household income include food and kerosene stamps, traditional welfare payments to the destitute by the Social Services Department, free textbooks and midday meals to school children, and travel concessions. During 1981 and 1982 certain additional welfare payments were also made as drought-relief assistance through the Social Services Department. It is unlikely that government transfers received by school children through midday meals, free textbooks, and concessionary travel were systematically estimated and recorded in this survey. Therefore, it can be assumed that most income recorded as government transfers was made up of food and kerosene stamps, traditional welfare payments, and special drought-relief payments.

From the total amount received as remittances from the government, the value of food and kerosene stamps was estimated by assuming that the most a family may have received as food and kerosene stamps was Rs 22 per capita. This maximum value was based on the range of maximum values observed in 1980-82 data from the Food and Nutrition Policy Planning Division of the Ministry of Plan Implementation (F&NPPD). In addition, households that reported receipts of government remittances by household assistants, such as servants and a category of persons identified as "others," were deleted from the analysis.[81] The number of households so removed accounted for less than 0.5 percent of the total sample. Estimates of the incidence of food stamp recipients and stamp values based on this methodology are presented in the text.

Table 45 provides estimates of the incidence of food stamp recipients based on another survey—the Nutritional Status and Socio-economic Survey conducted by the F&NPPD during 1980-82 (F&NPPD 1980-82). This survey collected information on food and kerosene stamps only from households with preschool children. Although collection of food stamp data was limited to certain regions, the final sample was large enough to judge the validity of using country-wide data from CFS 1981/82 to estimate the proportion of households receiving food stamps. Considering that the F&NPPD 1980-82 survey contained specific information on the values of food and kerosene stamps received by households, the close correspondence between the proportions receiving food stamps and the monetary value of stamps given in the two surveys validates the procedures adopted to distinguish food stamp recipients from data from CFS 1981/82. Further evidence on the consistency of using CFS 1981/82 data for evaluation of the food stamp scheme is provided by a survey of 1,000 households in two coastal districts—Kalutara and Galle--during 1980 by S. Abeyratne.[82] The results of an analysis of the raw data from this survey are given in Table 46. The high incidence of food stamp recipients in the table should be especially noted.

The procedures are validated further by the small difference between the estimated totals for the annual value of food and kero-

[81] In the CFS 1981/82 survey, incomes earned by the servants and "others" were also added to total household incomes. Such households were deleted to avoid their being counted as food stamp recipients in the event the servants or "others" were stamp recipients.

[82] For a description of this survey, please see Seneka Abeyratne and Thomas T. Poleman, "Socioeconomic Determinants of Child Malnutrition in Sri Lanka: The Evidence from Galle and Kalutara Districts," Cornell International Agricultural Economics Study, Cornell University, Ithaca, N.Y., July 1983.

Table 45—Households receiving food stamps, estimated from F&NPPD 1980-82 survey

Per Capita Expenditure Quintile	Households Receiving Food Stamps	Food Stamp Recipients			
		Per Capita Expenditures	Per Capita Value of Food Stamps	Household Size	Total Value of Food Stamps
	(percent)	(Rs/month)			(Rs/month)
1	71.2	114	16.05	6.63	106
2	68.7	116	16.94	5.84	99
3	50.8	210	16.16	5.61	90
4	45.1	264	16.00	4.78	76
5	20.6	382	17.50	4.37	76
All	51.0	195	16.42	5.71	93.75

Source: Estimated using raw data from the Nutritional Status and Socioeconomic Survey 1980-1982 conducted by the Food and Nutrition Policy Planning Division of the Ministry of Plan Implementation, Sri Lanka.

sene stamps calculated from CFS 1981/82 data and from the national accounts of transfer payments. The weighted average of the total value of food and kerosene stamps issued during 1981 and 1982 was Rs 1,660 million. The estimate from CFS 1981/82 shows the total stamps bill to be around Rs 1,640 million. Additionally, payments received as government transfers, other than food and kerosene stamps, indicate a total of Rs 230 million, which is close to the weighted average allocation of approximately Rs 260 million made by the Social Services Department to payments of traditional welfare and special drought-relief assistance during 1981 and 1982.

The general food subsidy that was in operation during 1978/79 consisted of subsidies on rice, wheat flour, sugar, and "other foods," consisting mainly of infant milk foods. The subsidy per unit of all these items except infant milk foods was calculated using the total subsidy on each commodity and the quantities issued by the food commissioner's department, which was the agency that operated the government monopoly on distribution of these goods. The estimated subsidies from CFS 1978/79 and subsidies reported in national accounts are shown in Table 47. Since a breakdown of the "other foods" category was not available, it was left out of the calculations of the subsidy for both periods. For national account data, see Table 17.

Table 46—Households receiving food stamps and value of stamps received, by expenditure quintile, Kalutara and Galle districts, 1980

Per Capita Expenditure Quintile	Households Receiving Food Stamps	Per Capita Value of Food Stamps*
	(percent)	(Rs/month)
1	88.42	17.28
2	79.68	16.17
3	73.43	16.70
4	66.49	16.22
5	51.05	15.13
All	71.83	16.41

Source: Data from a survey of 1,000 households by Seneka Abeyratne, described in Seneka Abeyratne and Thomas T. Poleman, "Socioeconomic Determinants of Child Nutrition in Sri Lanka: The Evidence from Galle and Kalutara Districts," Cornell International Agricultural Economics Study, Cornell University, Ithaca, N.Y., July 1983.

* These data are for recipients only.

Table 47—Estimates of the subsidy, 1978/79

Commodity	Consumer Finance Survey 1978/79	National Accounts (Weighted Average)
	(Rs/1,000)	
Rice	1,152,700.9	1,177,000.0
Wheat (including bread)	903,582.7	927,000.0
Sugar	127,105.7	138,600.0
Total	2,183,389.3	2,242,600.0

Sources: The CFS 1978/79 data are from Central Bank of Ceylon, "Report on Consumer Finances and Socioeconomic Survey 1978/79," Central Bank of Ceylon, Colombo, n.d. (computer tape). The national accounts data are from Central Bank of Ceylon, *Annual Report*, various issues (Colombo: Central Bank of Ceylon, various years).

APPENDIX 4: ESTIMATION OF APPARENT CALORIE CONSUMPTION

The two CFS surveys had data for 182 comparable food items. CFS 1981/82 had 9 additional items, such as apples, jak seeds, soybean products, knol-khol, and marmite (a vegetable extract), which were of negligible importance in the diets. These were deleted. CFS 1978/79 food data, which were reported using pounds and ounces as the units of measurement, were transformed to the metric system used in CFS 1981/82. The quantities were converted to edible portions where necessary, and then to calories, using the conversion factors recommended by the Medical Research Institute.[83]

However, food items for which the quantities were not provided but only the value of the purchases posed a problem. Food consumption for which only the value spent was given, such as food consumed away from home, can be important to some households, particularly in the urban sector. To approximate the number of calories contained in these foods, a procedure proposed by Timmer and Alderman was adopted.[84] The total expenditures on these items were divided by twice the unit cost of calories from starchy staples—rice, rice products, wheat, and wheat products. The calories so derived accounted for less than 2 percent of total calories, on the average. Given the minimal importance of such calories in the diets, any bias should be minimal and applicable to both data sets.

[83] W. D. A. Perera, P. M. Jayasekera, and S. Thaha, *Tables of Food Consumption for Use in Sri Lanka* (Colombo: World Health Foundation of Sri Lanka, 1979).

[84] C. Peter Timmer and Harold Alderman, "Preliminary Results of Sri Lanka Food Policy Data Analysis," June 1980 (mimeographed).

APPENDIX 5: RECIPIENT ATTITUDE TOWARD FOOD STAMPS

When the decisions were made to terminate the food rationing scheme, two options were considered, a direct cash transfer scheme and a food stamp scheme. The latter was chosen mainly on the premise that issuing cash to households would reduce the control the housewife usually has on spendable resources for food acquisition.[85] This, in turn, might have affected the nutritional welfare of the members of the household, particularly the children. This aspect of the food stamp scheme and other issues were examined in a study of 480 households from the Kandy district. Housewives of households receiving food stamps were asked a series of questions aimed at understanding how they perceived the food stamp scheme. Their spouses were asked the same questions separately.

Purpose and Adequacy of Food Stamps

The purpose the government had in issuing food stamps was clearly understood by almost all households as the enhancement of the food supplies of the household. Ninety-five percent of the wives and 93 percent of the husbands who responded confirmed this view. The remaining few respondents believed that nonfood consumption was expected to be increased as well. Almost all of the respondents felt that the incomes they were then receiving through food stamps were inadequate. Nearly half of the respondents, both husbands and wives, considered food stamps to be adequate for 7-10 days of food consumption. About 42 percent believed that food stamps could supply less than a week's food to their families. These observations are in general agreement with the share of food stamps in the food budgets discussed earlier.

Over 90 percent of the households used the food stamps during the first week of a month. Under the earlier rice rationing scheme, rice issues were made weekly. All food stamps appeared to have been exhausted within the first two weeks. During the period of the survey, the value of the kerosene stamp was Rs 22 per household. The value was increased from the original Rs 9.50 to account for the new administered prices on kerosene. Asked whether kerosene stamps were used to buy food, about 45 percent of the respondents said that they did. This fungibility is legal. There were a few households—about 8 percent—that used the food stamps from a future month for food purchases during the current month. Such "emergency" purchases were apparently limited to the stamps from the coming month by the authorized dealers who handle the food stamps on behalf of the government. A future month's stamps were usually used during the last week of the current month. There was an indication that the authorized dealers viewed the food stamp scheme as temporary, believing that the government might abandon it at any time. They thus perceived it to be dangerous to extend the risk of losing income for too long.

Sale of Food Stamps

One of the ways the desired effect of government transfers on nutrition could be dampened would be if food ration coupons or the food stamps were cashed and the proceeds used for nonfood consumption. However, emergency sales of food coupons that were meant to be used only later could also be made to tide over a current shortage in food consumption. In the Kandy survey, 60 percent of the wives who responded confirmed that they did sell food stamps when

[85] Personal communication from the Food Commissioner.

emergencies occurred. Of the husbands who were interviewed, only 3 percent said that food stamps were sold in emergencies. One inference from this discrepancy is that the husbands were not aware of practical aspects in the management of food budgets by the housewives. In general, it was observed that the male heads of the households delegated the management of the funds available for food acquisition almost completely to their wives. Further interviews with a few representative households showed that food stamps, which usually are valid for the next month, were sold at the cooperative store or the authorized dealer's store to which the household was assigned.

A smaller proportion—about 15 percent—of respondents also indicated that food stamps could be pawned to get emergency cash. The rate of interest paid on these loans ranged from 10 percent to 45 percent, with the majority of the respondents indicating that they paid an interest rate between 20 and 25 percent. These are short-term monthly rates.

Command Over Food Stamps

According to 73 percent of the respondents who were wives and 60 percent of the husbands, housewives had custody of the food stamps, which at the time of the survey were issued to households every six months. About 30 percent of the husbands said that they had custody of the food stamps. Were the housewives entrusted with the food stamps because of a desire for better safekeeping or because control over resources was rigidly demarcated? An answer can be inferred from the responses to a related question. When questioned regarding who decided how food stamps would be used, 24 percent of the wives and 37 percent of the husbands indicated the husband. Fifty-seven percent of the wives and 40 percent of the husbands indicated the housewife. It appears that in 25 to 30 percent of the households, the male head had custody and decided the use of the food stamps. Technically, food stamps are issued to each eligible individual in the household. Asked whether issuing the total value of a household's eligibility directly to the respondent would improve the nutritional intake of the household, only 5 percent of the husbands and 10 percent of the wives answered in the affirmative. All others said there would be no change. The nature of the command over food stamp resources appears to affect household nutrition only minimally. This is not surprising considering that the observed marginal propensities of these households to consume food out of overall spendable resources is very high.

Cash Versus Food Stamps

About one-fifth of both categories of respondents preferred cash to food stamps. Ten to 15 percent were indifferent to the form of the transfer. All others preferred food stamps. The main reasons provided by both types of respondents for their preference of cash rather than food stamps were, first, there were no losses from transactions with cash,[80] second, cash could be used any day or month, and lastly, one could buy goods from the cheapest source, which is not possible when food stamps are tied to a particular store.

The reasons given by those who preferred food stamps had one basis: the likelihood that cash would be spent on nonfood consumption. This perception of the majority of households in the Kandy survey is not substantiated by the food expenditure behavior of food stamp recipients observed nationally. The marginal propensity to consume out of income—whether it be cash incomes or food stamp incomes—did not differ by the source of income.

[80] The losses referred to in the first reason arise when the value of all goods purchased is marginally less than the face value of the food stamps. The dealers do not provide the difference in cash because of accounting difficulties. The buyer may use this difference as credit for an additional purchase using his own cash. Failure to do so results in the "losses" referred to.

Table 48—Weekly food purchase patterns using food stamps, Kandy district, 1984

Commodity	Expenditures as a Share of Food Stamp Transactions				
	Week 1	Week 2	Week 3	Week 4	Total
			(percent)		
Rice	62.00	7.53	2.57	3.81	75.89
Food stamp expenditures as share of total expenditures	61.00	12.00	4.00	4.00	23.00
Wheat flour	4.47	0.86	0.38	0.37	6.09
Bread	0.32	0.20	0.12	0.02	0.67
Pulses	4.25	1.13	1.42	0.89	7.70
Infant milk and powdered milk	2.82	1.11	1.64	0.57	6.16
Other foods	0.74	2.71	. . .	0.04	3.49
Total	74.60	13.54	6.13	5.70	100.00

Source: Estimated from a survey of 480 households from the Kandy district conducted in 1984 by the International Food Policy Research Institute and the Food and Nutrition Policy Planning Division of the Ministry of Plan Implementation, Sri Lanka.

Purchase Patterns

There was evidence that food stamps may not be substantially different from cash as a medium of exchange. This was seen in the list of goods that food stamps were used to purchase. Besides the legally allowed commodities, which included rice, paddy, flour, bread, sugar, milk products, and locally produced pulses, many other goods were reported to have been purchased with food stamps. These included foods such as (imported) pulses, spices and condiments, dried fish, potatoes, coconuts, tinned foods, tea, coconut oil, vegetable extracts, and vegetables; and nonfood goods such as shaving blades, boxes of matches, soap, writing books, pens, and pencils.

This list is lengthy, but food stamps have been mostly used to purchase rice. The daily food expenditures recorded for one month during the Kandy study confirmed that more than 75 percent of total food stamp use was devoted to buy rice, the main staple (Table 48). Food stamp recipients in this sample obtained nearly a quarter of their rice with their stamps. Most of these purchases were made during the first week of the month.

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PRODUCTION INCENTIVES IN PHILIPPINE AGRICULTURE: EFFECTS OF TRADE AND EXCHANGE RATE POLICIES

Romeo M. Bautista

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